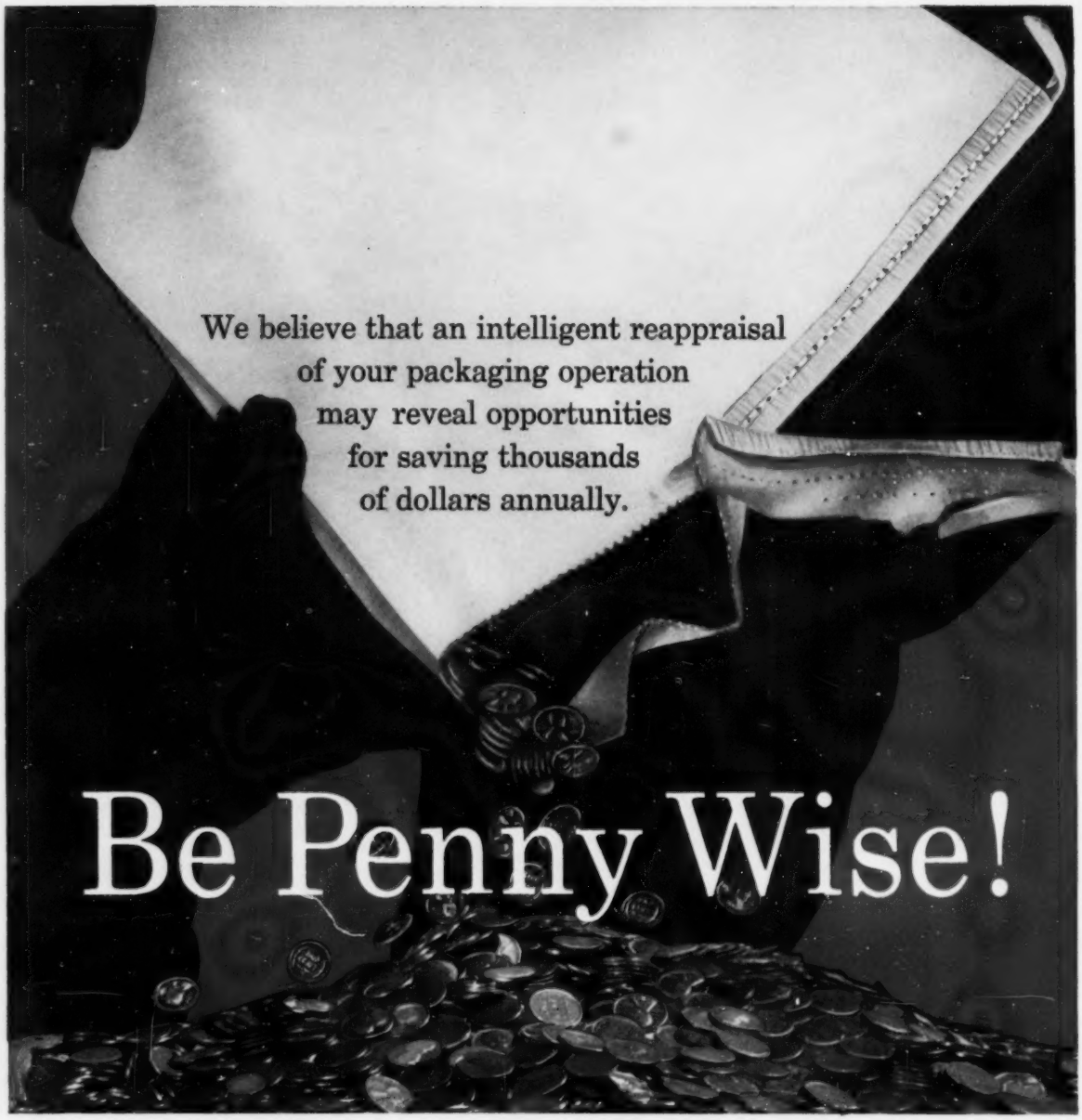
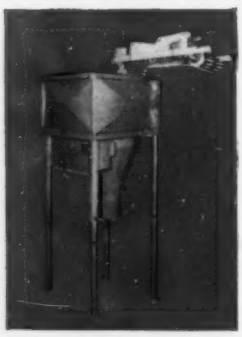
JULY, 1958

Commercial Fertilizer

and PLANT FOOD INDUSTRY



IN BUYING MULTIWALL BAGS NO SAVING IS TOO SMALL TO IGNORE!



THE KRAFTPACKER Open Mouth Bag Filling Machine, for free-flowing material, automatically saves pennies, too, through higher production and greater accuracy. Requires a lower investment and maintenance cost than any other automatic machine of its type in use today!

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.
Daily News Bldg., Chicago 6, Ill.

Integrated mills at St. Marys, Georgia and Gilman, Vermont

Exclusive Sales Agents for Kraftpacker

Show me how to save on my multiwall bag packaging.

Gilman PAPER CO.

COMPANY.....

ADDRESS.....

CITY..... ZONE..... STATE.....

PRODUCT MFD.....

NAME.....

CF

Make Nutronite

formerly SMIROW

the new sales builder in your fertilizer

NUTRONITE is the quality, natural organic supplement to chemical plant foods.

★ **Valuable to your customers**
because it provides for *controlled release* of plant nutrients for health, steady growth and good color.

★ **Valuable to your dealers**
because it is plainly visible in fertilizer—they can point to it in selling *your* brand.

★ **Valuable to your employees**
because it's less dusty—also no hazard in handling.

★ **Valuable to you**
for all these reasons plus giving you a new sales stimulant in a time of tough competition.

Let us figure the cost of NUTRONITE delivered to your plant.

SMITH NUTRONITE ROWLAND

SMITH-ROWLAND CO.
P. O. Box 1219, Norfolk 1, Va.
A DIVISION OF SMITH DOUGLASS COMPANY, INCORPORATED

SELL NUTRONITE FOR LAWNS

Bag straight Nutronite to fill out your line of lawn and garden fertilizers. Golf courses use large quantities, too. Colorful Nutronite bags available, plus merchandising aids. For information, write Smith-Rowland Co., Norfolk, Va.

Published Monthly by
WALTER W. BROWN PUBLISHING CO., INC.
75 Third St., N. W., Atlanta 8, Ga.
Phone TRinity 4-4160

Address all inquiries, advertising and editorial material, and correspondence to publishing offices in Atlanta, sending direct to COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, 75 Third St. N. W., Atlanta 8, Georgia.

President
ERNEST H. ABERNETHY

Editor
CLAY W. PENICK, JR.

Associate Editor
BRUCE MORAN

Business Manager
V. T. CRENSHAW

Chicago Representative
ELON A. ABERNETHY
1753 Howard St.—Room 200
Chicago 26, Illinois
Phone: Rogers Park 4-5616

West Coast Representative
M. A. CALDWELL
2267 W. 24th St., Los Angeles, Cal.
Phone: Republic 1-3050

Vol. 97 No. 1 *Established 1910* July, 1958

Commercial Fertilizer
and PLANT FOOD INDUSTRY

Subscription rates: United States, $3.00 per year; 5 years, $12.00. Foreign $5.00 per year.

Contents

COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, entered as second class matter, October 12, 1910, at the post office at Atlanta, under the Act of March 3, 1873. Published monthly except semi-monthly in September, by Walter W. Brown Publishing Co., Inc., 75 Third St., N. W., Atlanta 8, Georgia.

Commenting Freely

by BRUCE MORAN

My wife, who never before grew anything at all, recently decided she must have tomatoes fresh from the garden. So she went to a local garden supply retailer and came home with four tomato plants about six inches high, in pots.

The store had told her to expect 70 tomatoes on each plant, so she is convinced she will get 280 firm and beautiful love-apples during the Summer. And maybe she will.

But the thing that fascinated me was the small bag of fertilizer she bought along with the plants. I'll not get into the analysis, but the label says, big and bold, "Tomato Fertilizer." And that's a tale all of us should heed.

There is a premium market for specialized fertilizers. You'll see them in really top-drawer retail places. They are in small units, which justifies a good retail price. And they sell along with seeds and plants as my wife bought the Tomato plant food.

This is no secret. We have pointed out within the past few months, on a number of occasions, that such specialty analyses amount to about 10% of the total tonnage. They can be much more, with smart packaging and modern merchandising. And there's a fine, healthy profit in it for all.

P.S. My wife's four tomato plants are flourishing like the proverbial green bay tree.

Exclusive from International — *"Creators of Living Minerals"*

Full Orbit Service

An exciting new concept of full range service that helps you sell more fertilizer profitably

FULL ORBIT SERVICE . . . a dynamic, new concept of buyer-supplier teamwork, exclusively yours from International Minerals. It's geared and powered to help you sell more goods at less cost, with greater profit. FULL ORBIT SERVICE puts the entire International Minerals organization to work for you . . . welds every "look-ahead" and promotional resource into a result-getting business force. Your International representative will help you build your plans for a successful year around FULL ORBIT SERVICE. Ask to see it right away so you can use it in planning your next season's program.

Out-of-this-world service for down-to-earth results

International MINERALS CHEMICALS

Phosphate Minerals Division • Potash Division • Phosphate Chemicals Division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center — Skokie, Illinois

JUST AROUND THE CORNER *by Vernon Mount*

Congress is on a slow march toward lower price-supports and less planting regulation of America's farmers. They don't like the idea and the progress in that direction will be mighty gradual. But it's on the way, and we might just as well brace ourselves for the shock of a return to free American enterprise on the farm.

Weaknesses in the whole crop control machinery are beginning to become apparent to the general run of Congress, and even the rock-ribbed farm bloc members are having faint doubts. The farmers know they have lost the export markets, to competitive nations where prices move freely with supply and demand. And there is muttering along the furrows that maybe this Benson has something.

Our farmers are feeling so much better than they did that there is no general cry for help. But such organizations as the Farm Bureau are quietly pressing for action. Sooner or later they will get it.

Yours faithfully,

Vernon Mount

Announcing the Revolutionary

Raymond Rotomatic Packer

Here is the machine that is changing all standards for accurately weighing and packing free-flowing materials in open-mouth multi-wall bags! The Raymond Rotomatic Packer is fully automatic, all-mechanical, and requires no outside source of power such as electricity or compressed air. It combines gravity operation with the even balance scale principle that delivers simplicity of operation, accurate weights, and high rate of production.

Practical bagging rates are limited only by the operator's ability to feed bags to the filling tube. The Raymond Rotomatic Packer handles 50 lb. bags up to 100 lb. bags with equal ease. Bag size changes take less than 60 seconds and the first new size bag is correctly weighed.

Practical variances in material density do not affect the accuracy or operation of the Raymond Rotomatic Packer. The machine design limits material in suspension to a minimum, further improving weight accuracy.

No specialists are required to maintain and service the Raymond Rotomatic Packer. Scale assembly can be adjusted by regular scale mechanics and any competent mechanic can service the unit.

Engineering, operation, and installation details are available from any Raymond Representative. For more details and information, write or call the Raymond Office nearest you.

SALES OFFICES

Middletown • Richmond • New York • Chicago • Minneapolis
Denver • St. Louis • Kansas City • Detroit • Charlotte • Memphis
Philadelphia • Baltimore • Houston
Cleveland • East Aurora, N.Y. • Louisville • Orlando

Raymond

BAG CORPORATION

a division of Albemarle Paper Mfg. Co.
Middletown, Ohio

Cooperatives Do $261 Million

Those who have followed our "Around the Map" feature each month for the past decade will not be surprised that farm cooperatives in the 1955-56 season handled $261,255,000 of fertilizer. Those who have carefully read "Around the Map" for the past five years or so are aware of the depth to which ccoperatives had gone into primary production, especially of various forms of nitrogen.

Today these sources of basic fertilizer material represent around 10% of the total going into mixed goods. In the deep South, in the mid-West, in California, farmer-financed plants, costing many millions each, are delivering or planning very soon to deliver ammonia, and there has even been a prediction that by 1975 or so the farm cooperative will supply three quarters of the fertilizer tonnage consumed on farms.

Mississippi Chemical was hardly in production when they began expanding the Yazoo City plant . . . and started the Coastal plant at Pascagoula. They are supplying consulting aid to the Valley group in Fresno. The Central Farmers group is expanding rapidly, merging with other, smaller groups—as we have been reporting for some time. Central Farmers are now a big producing factor in the Carlsbad potash area. Their Kansas plant alone produces some 64,000 annual tons of nitrogenous material. Add to this the 70,000 annual tons of the new St. Paul plant in Minnesota and you come up, counting several other mid-West units, with around a quarter of a million tons produced by cooperatives in the mid-West alone.

Cooperative membership has expanded rapidly of recent years. USDA has just issued a report which shows the number as multiplied by three between 1926 and 1956 . . . more than 7,700,000 as of '56. And this was a period when the number of farmers was rapidly decreasing. USDA says "As the number of farmers has decreased, those who remain on the farm are relying increasingly on their own cooperatives to market their products and purchase their farm supplies." Farm supplies, including fertilizer, handled by 7,330 cooperatives ran to $2,044,272,000, according to USDA. 4,011 of these sold fertilizer to their farmer mem-

Continued on page 77

FROM

Receiving raw materials

TO

Shipping finished product

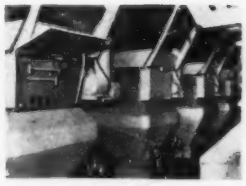
I & C can Save You Money

Here's <u>one</u> way: *<u>Batch Weigh</u>*

single unit

cluster system

multiple unit system



Economy • Saves Labor . . . Cuts Operating Cost . . . Completely Automatic or Manually Operated Controls.

Accuracy • Correct Analysis Assured . . . No Penalties . . . Nothing Given Away.

Dependability • Many Years Experience . . . Simple Design . . . Highest Quality Workmanship.

Speed • Geared to Your Requirements for Smooth Operation . . . Completely Flexible.

Proof • Satisfied Customers in the North, East, South and Midwest.

for more information, write to

INGLETT & COMPANY, INC.

P. O. Box 3425 **Augusta, Ga.**

For uniformly conditioned mixed goods, use

Du Pont UAL-S

Here's how it works . . .

New Du Pont UAL-S permits you to take advantage of the well-known conditioning effect of sulfates in fertilizers. A small amount of ammonium sulfate added in a finely dispersed form as in UAL-S is equivalent to a much larger amount added dry to the mixture . . . ammonium sulfate means better, more uniform conditioning. All of your fertilizers will benefit from nitrogen derived from UAL-S, because it combines two efficient forms of nitrogen with ammonium sulfate to provide added sulfur . . . an essential plant nutrient with recognized agronomic value.

Regular mixtures cure well with UAL-S, are free-flowing and resist caking. In granular mixtures, UAL-S aids in producing good yields of hard, round, firm granules that store and distribute well. UAL-S is non-corrosive to fertilizer manufacturing equipment, including mild steel and aluminum, and it's safe—handles at moderate pressure, and there's no danger of flash fires.

Du Pont specialists can give you at-the-plant advice on proper use of UAL-S in your fertilizer mixtures. They stand ready to assist you in profitably formulating mixtures containing UAL-S. For further information on UAL-S, fill out and mail the coupon.

PROPERTIES OF UAL-S

Nitrogen Content	42.5%
Freezing Point	20°F.
Pressure	15 psi at 60°F.
Specific Gravity	1.13
Fixed to Free Ratio	.9 to 1.0

Composition: Parts/100

Urea	38.8
Ammonium Sulfate	10
Ammonia	27.1
Water	15.1
CO_2	9.0

Du Pont UAL solutions in mixed fertilizers have helped American farmers grow better crops for 25 years.

URAMON®

AMMONIA LIQUORS

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Department, Room 2539-W
Wilmington 98, Delaware

Dear Sirs: Please send me more information on UAL-S.

Name_____

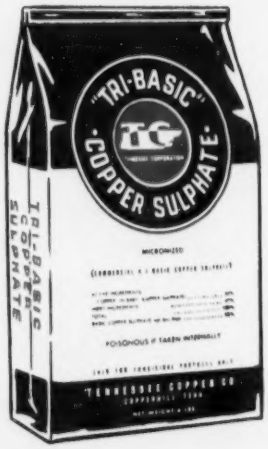
Firm_____

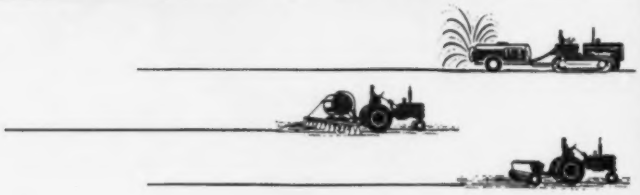
Address_____

City_____ State_____

The Versatile Fungicide

TRI-BASIC COPPER





You get so many more advantages with Copper fungicides — used as a spray or dust on practically all truck crops in the control of persistent fungus diseases — Tri-Basic provides control of citrus and grape diseases, also on many deciduous fruits — Tri-Basic has excellent adherence qualities and protects longer — lower disease control cost, greater yield of top quality produce.

TRI-BASIC COPPER SULFATE
Quality Controlled from Mine to Finished Product

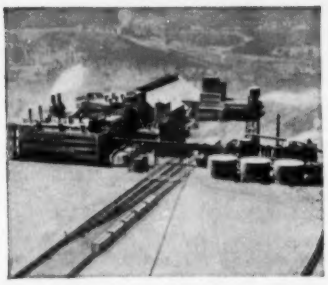
For further information please make requests on your company's letterhead.

Is there another Fungicide offering these advantages?

- Longer Protection
- Easy to Apply
- Economical
- Upgrades Quality of Fruits & Vegetables
- Longer Shelf Life
- Corrects Copper Deficiencies
- Effective Control
- Always Dependable
- Compatible
- Plentiful Supply

TENNESSEE TC CORPORATION
TENNESSEE CORPORATION

617-629 Grant Building, Atlanta, Ga.



Never a delivery worry!

We've expanded our plant facilities to whittle down delivery schedules ... to ship Run-of-Pile Triple Super *when, where* and the *way* you want it. Try us. We deliver the goods!

Davison's new Run-of-Pile Triple Superphosphate is guaranteed to satisfy you on every count!

- BETTER AMMONIATION RESULTS—Because of its friable texture, this triple super has a high rate of ammoniation . . . absorbs more pounds of free ammonia per unit of P_2O_5.
- HIGH IN P_2O_5 CONTENT—Constant high analysis . . . 46-48% A.P.A.
- STORES BETTER—This triple super is shipped in excellent mechanical condition. It is well cured, and milled and screened at time of shipment.
- UNEXCELLED QUALITY—This triple super is backed by Davison's more than a century of experience in fertilizer formulation. It's guaranteed to satisfy you on every count.
- IN STOCK AND READY TO GO—We're ready to ship Davison Run-of-Pile Triple Superphosphate by rail, ship or barge. Write or call today!

DAVISON
CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland

Research

OM'S BOB EVANS AND A NEW SLANT ON EDUCATION

An experiment in science education has passed its first year, and may well spread to the point of influencing all education in the future. It is known as the "Monroe Plan" because it was tested in Monroe, La. And it came into being because Robert H. Evans, vice-president and general manager of Olin Mathieson's Forest Products division saw the need and did something about it.

Olin Mathieson are the largest employers in Monroe. When Sputnik 1 first took to its orbit, and the problem of science education shocked the entire US, Bob Evans came up with the Monroe Plan. The first item was the Frostkraft Grant for Science Education, from the Forest Products division . . . $10,000. The second step was to secure Lon H. Colborn, a master teacher with the gift of inspiring students with the drama and the excitement which lies in the study and practice of science.

The third step was to weed out all but a small group—30 superior students. The examination these took to become eligible, would stump most of us who think we are well-informed. Not academic questions, but 100 queries that ranged from algebra to zoology, designed to prove the student could think, could absorb information.

These 30 were chosen from 55 who applied, knowing that the course would be tough, and last September they went to work with Colborn, two hours daily in the classroom and laboratory; two hours more of, not home-work, but faithful science reading. Each day.

To further weed out the deadwood an exam was held at the end of the first 6 weeks, which the local school authorities considered mighty tough for students with a full year of chemistry, but impossible for six-week students. But they passed it.

As a result of this the School Board of Monroe voted money which has given the school chemistry facilities that rank among the top two or three high schools in the entire US.

The product of the first year, in addition to what the kids have learned about chemistry, is a new respect for learning. In Monroe being a brain is no longer something of which to be ashamed,—but something of which to be proud.

The plans just ahead call for several surrounding schools to send to Lon Colborn's classes the cream of their crop. The idea is expanding. It might well become a national technique. Students, parents, educators alike are enthused. And the credit goes to Olin Mathieson's Bob Evans.

Expansion of the idea requires more people like Bob, who can put up the initial money, and who will trouble to find inspired teachers like Lon Colborn. Given that formula it will not be long before the community itself will get on board the band-wagon, as has Monroe — and carry on from there.

WHAT'S NEW IN RESEARCH

A Series of scientific papers is being presented at W. R. Grace & Co.'s Washington Research Center, Clarksville, Md. These are being presented at intervals by outside authorities, as well as by members of the Grace research and development team. They invite all in related technical fields to attend.

* * *

Ottowa reports that even the highly fertile soils of Nova Scotia and New Brunswick can do with fertilizer. The Nappan Experimental Farm increased yield of pasture grasses 61% following an annual application of ½ ton ground limestone and 200 pounds of superphosphate fertilizer. The extra grass produced 185 pounds more beef than an adjoining control area.

* * *

Gibberellic acid pops up a lot in our mail. Here are two current samples. It keeps bluegrass growing during the Summer, according to University of Wisconsin research. And New Mexico A&M Experiment Station says that fresh peach seeds will come up as seedlings in about 15 days—whereas normally they will lie dormant for 60 to 90 days before sprouting. They are not sure yet of the exact use to recommend, but point out that the new miracle acid can save peach people a whole year in their breeding work.

* * *

Cropping sequence, which we know has an effect on yields of many crops, may also turn out to have an effect on weeds. At the University of Minnesota they found, for example, that flax in fields planted to the same crop the year before had half as many yellow foxtail plants per square yard as was true when flax followed oats. But on a dry-weight basis they came out even. So, they are sticking to the standing recommendation that flax be planted in fields that raised some other crop the year before.

* * *

Lime to the extent of 4,000,000 tons is needed to bring North Carolina soils up to proper lime levels, and 1,000,000 needed annually to keep them that way. At least, so says their Extension Service. And, they add, tests show that lime at two tons per acre on Ladino clover, brings back $17 for each dollar spent. Of course, a soil test precedes application.

Wild Lands Research Center For California

University of California will establish a Wild Lands Research Center at their Statewide AES, under the direction of Henry J. Vaux, dean of the School of Forestry. Here focus will be had on a wide array of projects all bearing on the 65 million acres of wild lands in the State. Among the subjects to be given intensified study will be management practices for range lands and forests.

Even if all the forest land in the US which is capable of producing commercial tree crops were put fully to work, this country may have trouble meeting its future timber needs. So says the US Forest Service.

THERE'S A *BLUE VALLEY* GRANULATION UNIT ENGINEERED FOR YOUR PLANT...

Large or small . . . there's a Blue Valley Granulation unit that will produce quality granular fertilizer at the lowest cost in your plant. Important reasons why manufacturers choose Blue Valley are . . .

BLUE V

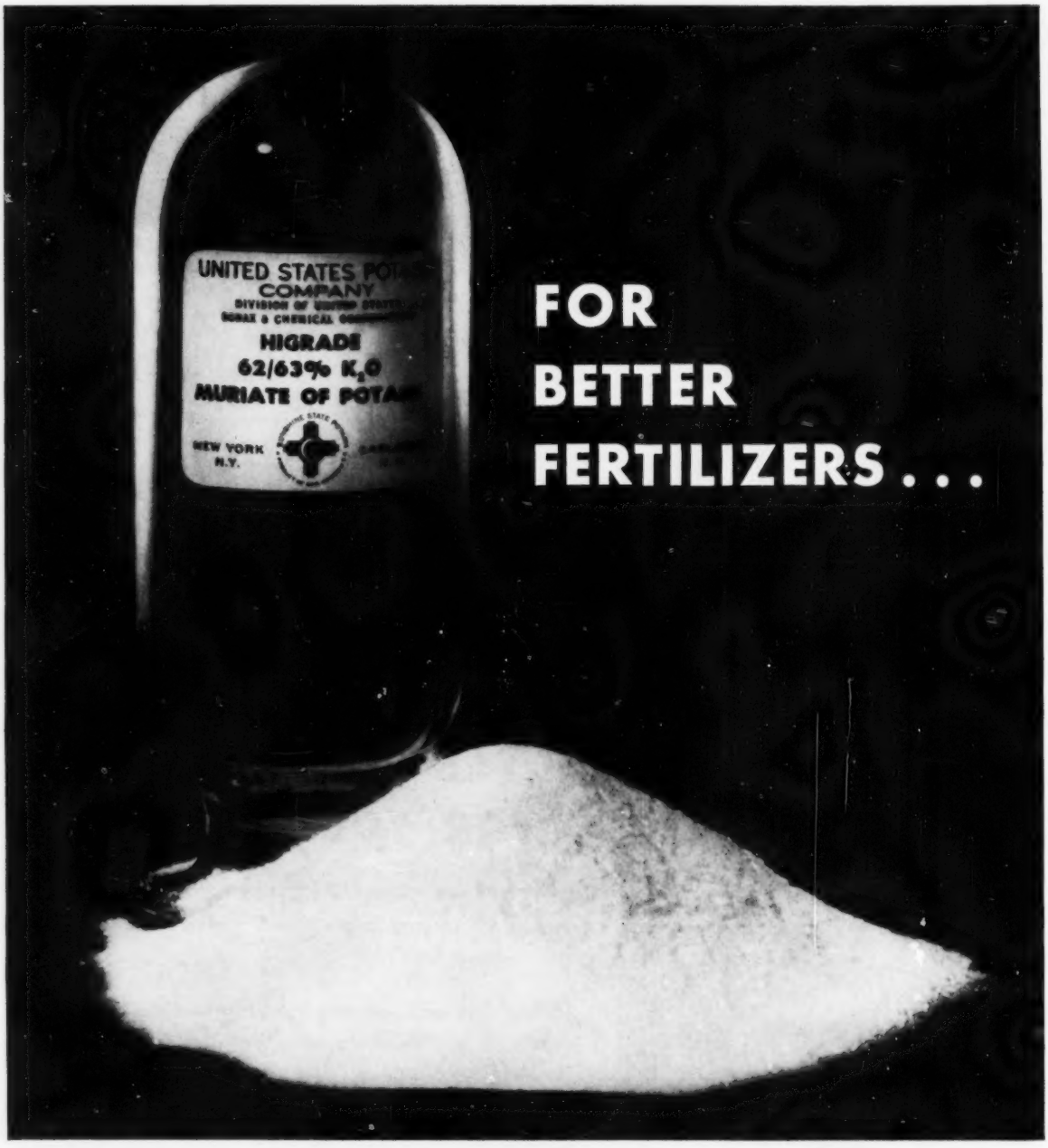
BLUE VALLEY EQUIPMENT MFG. AND ENGINEERING CO.
LAURENT AND N. TAYLOR
TOPEKA, KANSAS

. . . Blue Valley engineers are constantly working under actual operating conditions to provide the lowest formulation costs for their customers by using the lowest cost raw materials economically possible.

. . . Blue Valley offers economy! Blue Valley Granulation units cost less to buy, install, and operate.

. . . The installation of Blue Valley Granulation units does not require a major equipment change. Double screening provided to meet your requirements with a minimum of recycle.

. . . Blue Valley offers heavy, dependable equipment for efficient operation, and with practical, visual control of the granulation process. Don't hesitate . . . investigate today!



USP'S HIGRADE MURIATE OF POTASH

USP's Higrade muriate of potash (62/63% K_2O)—perfect for the manufacture of modern fertilizers. This superior white potash is non-caking and free-flowing throughout.

Our Technical Service Department stands ready to answer any inquiries.

USP also offers Higrade Granular muriate of potash—62/63% K_2O—and Granular muriate of potash—60% K_2O—both free-flowing and non-caking.

UNITED STATES POTASH COMPANY
DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION
50 Rockefeller Plaza, New York 20, New York
Southern Sales Office: Rhodes-Haverty Building, Atlanta, Georgia

MEMBER: AMERICAN POTASH INSTITUTE

REG. U.S. PAT. OFF.

Arcadian® News

Volume 3 | For Manufacturers of Mixed Fertilizers | Number 7

HOW TO hit NITROGEN on the nose!

Methods that Help Insure Accurate Formulation

Do you use plenty of nitrogen in formulating high-nitrogen fertilizers and then find that your analyses do not always meet minimum guarantees?

Are you forced to resort to excessive formulation to get sufficient nitrogen into high-analysis fertilizers?

Have you ever detected the pungent odor of ammonia emerging from the exhaust pipe on the roof of your plant?

When you are faced with any of these problems, it will pay you to take a careful look at the equipment and the methods you use in ammoniation.

In manufacturing pulverized or granulated high-analysis fertilizers, by batch or continuous mixing, failure to hit nitrogen content "on the nose" is often due to poor combination of ammonia with superphosphate and any added acids in the mixer.

Uniform distribution of the acid throughout the mass is just as important as uniform distribution of the ammoniating media. Uniform distribution insures effective utilization of all ingredients.

Efficient maintenance and use of correctly-designed distribution pipes are essential to uniform distribution of the acid and the ammoniating media. Correct techniques of operation must be observed to derive full value from the equipment.

A distribution pipe is basically a metering manifold and accuracy of metering ingredients is vitally important. This accuracy can be destroyed by corrosion and abrasion of the pipe. Corrosion and abrasion are cumulative and may pass unnoticed in their early stages unless a careful checking procedure is diligently maintained.

Improper use of acids and ammoniating media often causes the formation of many large particles too early in the ammoniation stage. This seriously limits further ammonia take-up by the superphosphate. Some of the unreacted acid may be buried inside these particles. Addition of more acid aggravates the situation and is a costly way of handling the problem. In extreme cases, it may also be dangerous.

Important Checkpoints

When your analyses indicate a loss of nitrogen in the ammoniation process, your first checkpoints should be: 1) Is your manpower efficient? 2) Are you using the proper distribution pipes and are these maintained in the best possible operating condition? 3) Are your formulation techniques correct for the fertilizers you wish to produce? 4) Are you using the ammoniating solution that is best suited to your methods and equipment?

Occasionally, loss of nitrogen occurs in the dryer. This may be due to excessive firing of the furnace as a result of poor installation or poor maintenance of the dryer. It may also be caused by forcing equipment beyond its capacity during periods of peak output.

In storage, there is seldom any appreciable loss of nitrogen from conventional formulae. When this does happen, a thorough appraisal of every phase of production should be made immediately.

Ask Nitrogen Division

When you have a formulation or an ammoniation problem, it will pay you to get the advice of Nitrogen Division, Allied Chemical, technical service men. These men have a thorough knowledge of the entire operation of a fertilizer plant. They often assist in the selection of equipment and in the suggestion of more efficient, money-saving methods all along the production line.

This service is available to Nitrogen Division customers without charge. Get the facts from your Nitrogen Division salesman . . . or contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N.Y. Phone: Hanover 2-7300

Technical Tips

ACIDS REQUIRE SAFE, EFFICIENT HANDLING

Efficient, economical and safe use of acids in the manufacture of mixed fertilizers depends on proper equipment kept in good working condition and a thorough knowledge of the techniques involved. Improper handling can be expensive and hazardous.

When acid and ammoniating equipment does not function correctly, due to poor handling, faulty design, or deterioration, valuable acids and other ingredients can be wasted without producing fertilizer of the desired analysis and physical condition.

Thorough and uniform distribution of the acid in the mass is vitally important. Although the acid is not volatile and will not escape from the hot mass, it must combine with ammonia to be effective. Volatile ammonia will not "hunt" through the mass to find acid concentrated in spots. Among other things, properly-designed distributor pipes, free of corrosion and abrasion, are essential to uniform distribution of acid.

To achieve a desirable liquid phase in producing granulated fertilizers, heat may be substituted for some moisture. In accomplishing this, the use of considerable quantities of sulfuric acid is advisable to remove more of the controlling influence of water.

In using acids, it is questionable practice for the operator to attempt to solve poor performance of equipment by improvised procedures. For example, many operators have discovered that ammonia fumes will disappear with the addition of more acid.

This is a dangerous procedure, especially if satisfactory results have been previously obtained without the extra acid. Even a small change in the amount of any ingredient may wreck the formula, unless the change has been carefully studied and deemed advisable. Check your equipment and your methods before changing your formula.

Care should be taken to prevent sulfuric acid from contacting a concentrated region of potassium chloride. This promotes efficiency and safety and avoids air pollution problems.

In controlling amounts of acids through metering, weighing or measuring, changes in specific gravity due to temperatures should be taken into consideration. The viscosities of sulfuric and phosphoric acid at low operating temperatures can seriously affect the operation of metering devices. This problem may be solved by the use of magnetic meters or by warming the acid for metering.

It is safer to control the flow of acid by an electrically-driven pump than by air pressure. A pump can be quickly stopped by remote control, whereas air pressure is more difficult to handle.

Because of their limited pressure, centrifugal pumps are usually used for both acids. These are made of stainless steel. Cast iron and black steel are sometimes used for 60° and 66° sulfuric acid. Stainless steel mechanical seals and Blue African asbestos packing and some of the new synthetics are used in pumps.

The action of sulfuric acid on steel and cast iron will release hydrogen which will develop excessive pressure in confined space, such as between closed valves in a line. Hydrogen combined with air can form an inflammable or explosive mixture which necessitates precautions against lights, fires and sparks.

The use of water to flush out steel or stainless steel equipment, including flowmeters, has resulted in severe corrosion and faulty performance. Dilute sulfuric acid is corrosive to some materials that are resistant to the more concentrated 60° and 66° Be sulfuric acids. Even small amounts of moisture in the air may cause localized corrosion if it contacts sulfuric acid.

For safety to employees, all personnel handling acids should wear special goggles, full face masks and heavy rubber gloves. Rubber is quickly attacked by sulfuric acid. Large flow showers should be provided near the dryer areas.

Here is another in the series of educational news features on fertilizer now being released to more than 1,000 newspapers by Nitrogen Division, Allied Chemical.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION

NEW BUSINESS FROM OLD CUSTOMERS

Do you remember the story about the prospector who spent years searching the far-away hills for gold and then found nuggets in his own back yard?

If you seek new markets for a bigger tonnage of your brand of fertilizer, it may pay you to concentrate your efforts on your own customers in territory near your plant where transportation costs are low and profits are high.

Most farmers are not using nearly as much fertilizer as they could profitably use. For proof of this, check actual tonnage used as compared to official state fertilizer recommendations. You'll discover a big difference, whether you are in Carolina or Kansas, Coachella or Kalamazoo.

Consider the state of Georgia, for example. It's an old state, from a fertilizer standpoint. Georgia farmers have been using fertilizer for a long time and now buy more than 1¼ million tons per year. But there is a big opportunity for more fertilizer sales.

If all the cotton, corn and pasture acreage in Georgia was fertilized according to official recommendations, the farmers of the state would be using 750 thousand *more* tons of mixed fertilizer and 500 thousand *more* tons of nitrogen products for top-dressing. Along with this, they would use five times as much lime as they now use. As a result, cotton, corn and pastures would produce an extra $200 million in farm income for Georgia farmers.

Yes, Georgia cotton needs 40 to 50% more fertilizer for the best yields and profits . . . corn needs 60 to 100% more fertilizer . . . small grains, 50% more . . . soybeans, 100% more . . . and pastures, 200% more. Even high-value crops, such as tobacco, citrus and truck, could profit from 10 to 30% more fertilizer, according to state college recommendations.

Georgia recognizes the need for more plant food, and the state extension service and the fertilizer industry are cooperating in a campaign to urge farmers to get bigger yields and better profits by using more fertilizer. This joint effort is making progress in Georgia. Such a campaign can be equally successful in other states.

In the corn belt, for example, only 40% of the corn crop was fertilized in 1950. By 1954, 64% of the corn in this area got some fertilizer. There are still a lot of acres of corn which get no fertilizer.

And most of the corn that is fertilized needs more fertilizer than it gets. In 1950, the fertilized acre of corn in the corn belt received the equivalent of 200 pounds of 4-12-9, and in 1954 it got the equivalent of 200 pounds of 12-14-14. Many good corn belt farmers use the equivalent of 800 pounds of 20-10-15 and many more need to, year after year.

Your Best Market

Wherever you sell fertilizer, your best market is near your plant. Your own customers can be sold on the idea of using more and better fertilizer.

Per-acre use of fertilizer is gradually inching upward. How can you make it move up faster? It helps to know, and to quote, your state extension service fertilizer recommendations. Most farmers are far below official recommendations in their use of fertilizer.

It pays to cooperate in the soil testing program in your state. When you have accurate knowledge of the plant food needs of a field, you are in a better position to sell the right fertilizer analysis. This produces the best results for the farmer and for you.

Most soils east of the Missouri River need lime to produce top benefits from fertilizer. Starting an off-season lime-spreading service helps build your business as well as the farmer's.

It pays to push high-analysis mixed fertilizer. You save on hauling and handling, and so does the farmer. Since most crops need a high-nitrogen fertilizer program, putting more nitrogen into your mixed fertilizer will benefit both you and the farmer. The farmer gets better crops and you put more of your straight nitrogen sales into your mixed fertilizer bag.

These are only a few ideas that will help you build new business among your present customers in your own sales area. The territory near your plant is a big tonnage opportunity.

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60° F	Approx. Vap. Press. at 104° F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6	42.0	19.5	66.3	6.0	8.2	9.3	1.178	10	34
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

Other ARCADIAN® Products: N-dure® • UREA 45 • A-N-L® Nitrogen Fertilizer Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION

Allied Chemical

MAIN OFFICE: 40 RECTOR STREET, NEW YORK 6, N. Y., PHONE HANOVER 2-7300

Hopewell, Va., P. O. Drawer 131 ..... Cedar 9-6301
Ironton, Ohio, P. O. Box 98 ..... Ironton 8-4366
Omaha 7, Neb., P. O. Box 166 ..... Bellevue 1464
Raleigh, N. C., 16 W. Martin St. ..... Temple 3-2801
Columbia 1, S. C., 1203 Gervais St. ..... Alpine 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
Columbia, Mo., P. O. Box 188 ..... Gibson 2-4040
Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443
Kalamazoo, Mich., P. O. Box 869 ..... Kalamazoo 5-8676
St. Paul 14, Minn., 764 Vandalia St. ..... Midway 5-9141
San Francisco 4, Cal., 235 Montgomery St. Yukon 2-6840

THE 57-58 FERTILIZER SITUATION

by
J. N. MAHAN
and
C. A. GRAHAM

The Fertilizer Situation for 1957-58 is the fifteenth in a series of annual reports issued by agencies within the U. S. Department of Agriculture.

In preparing this report helpful assistance has been given by the Bureau of the Census, Business and Defense Services Administration and the Civil Aeronautics Administration, Department of Commerce; Bureau of Mines, Department of the Interior; Chemical Division, U. S. Tariff Commission; and the Fertilizer Investigations Research Branch, Soil and Water Conservation Research Division, ARS, U. S. Department of Agriculture. This assistance is gratefully acknowledged.

J. N. Mahan is staff specialist and C. A. Graham administrative assistant for the Food and Materials Requirements Division, Commodity Stabilization Service.

Supplies of nitrogen (N), phosphate (P_2O_5) and potash (K_2O) are expected to be adequate for meeting domestic agricultural requirements as well as export demand. The fertilizer industry has the greatest capacity in the history of the United States for producing all three primary plant nutrients.

Estimates of supplies of plant nutrients available for fertilizer purposes in 1957-58 (July 1 through June 30) are based on trends in movement of fertilizer materials during the first 6 months of the year, assuming that those trends will not change materially. On that basis, it is estimated that 6,506,000 tons of nitrogen (N), phosphate (P_2O_5) and potash (K_2O) will be made available for domestic fertilizer purposes in 1957-58, a total approximately 2 percent less than estimated for 1956-57.

A brisk movement of fertilizer materials in the fall of 1957 tapered off into the usual winter lull. Inventories were built up in preparation for the anticipated spring season in 1958, which was slow in developing. Unusual weather conditions damaged early crops in some areas and delayed plantings beyond the normal dates in others.

Production was curtailed in some plants because storage capacities limit quantities of materials which can be accumulated by the industry. Handling and transportation facilities often limit the rate at which current inventories can be moved out and replaced during rush seasons. On the other hand, improved methods of processing have resulted in better products and have favored reduction in the elapsed time between manufacture and shipment.

What is supply?

The net U. S. supply of the primary plant nutrient materials is the quantity available for domestic fertilizer purposes. It includes supply from domestic production, plus imports and minus exports. By supply from domestic sources is meant U. S. production for fertilizer purposes adjusted for inventory differences that are known or can be estimated.

Primary producers of nitrogen, phosphate, and potash sell to industries other than the fertilizer industry, although a major portion of production goes into fertilizers. Productive capacity is greater than requirements for each of the plant nutrients, consequently production is regulated to some extent by expected requirements of the trade—fertilizer manufacturers and distributors. Producers of anhydrous ammonia, phosphates, and potash may have inventories not committed or assigned to any industry. For this reason estimates of supply are limited to the quantities that have actually moved or are estimated will move into fertilizer trade channels.

Owing to losses in the manufacture of nitrogenous fertilizer materials, the input of nitrogen is greater than the final N content of the products. These losses are estimated to be about 10 percent in the case of solid materials.

Manufacturers of mixed fertilizer have losses in handling and formulating their products. Further shrinkage occurs during movement to local fertilizer dealers and to farmers. These losses may amount to a further 5 percent of the input of nitrogen.

Shrinkage of P_2O_5 takes place in standardizing run-of-pile superphosphates. It is even greater in the process of ammoniation (because ammoniation reduces the amount of available P_2O_5) and in the manufacture of mixed fertilizers.

Losses in manufacturing and handling of potash are probably less than for the other nutrients.

Figures showing the inventories of primary producers are not available for a number of products, since such stocks vary and their approximate size cannot be definitely determined. Likewise inventories in trade channels vary. This situation further limits the accuracy of an estimate of net supply for a given year.

N

Supplies of nitrogen for fertilizers are expected to total 2,400,000 tons of N in 1957-58 (table 1), an increase of approximately 5 percent over 1956-57. The quantity of ammonium sulfate is expected to decrease, other nitrogen-containing products to increase over a year ago. Quantities of urea and ammonium phosphate entering the fertilizer trade are becoming significant. Use of anhydrous ammonia (including by-product and synthetic ammonia liquor) and other liquid nitrogen materials is climbing.

The supply of solid ammonium nitrate continues to grow but there is some question as to the net amount destined for fertilizers. A sizeable quantity of fertilizer-grade ammonium nitrate is being used for industrial purposes. For the purpose of this report no attempt has been made to segregate actual supply for fertilizers from total quantity of the solid fertilizer grade. The figure for ammonium sulfate was adjusted for the quantity estimated to have gone into other uses.

Indications are that the quantity of anhydrous ammonia (including aqua ammonia) going into the formulation of fertilizers and for direct application is much greater than generally believed. There is evidence that sizeable quantities of anhydrous ammonia are being converted to aqua ammonia by fertilizer manufacturers and anhydrous am-

Table 1.—NITROGEN: estimated supply of nitrogen for fertilizer purposes 1956-57 and 1957-58, United States and possessions[1]

ITEM	1956-57[2]	1957-58
Supply from domestic sources	(1,000 short tons N)	
Solids:		
Ammonium nitrate	411	455
Ammonium sulfate	405	369
Urea	69	87
Ammonium phosphate	83	89
All other solids	99	99
Total solids	1,067	1,099
Liquids:		
Ammonia (including aqua)	684	755
All other	511	565
Total liquids	1,195	1,320
Total (solids and liquids)	2,262	2,419
Imports		
Ammonium nitrate	65	71
Ammonium sulfate	37	30
Urea	24	29
Ammonium phosphate	23	27
Ammonium nitrate limestone mixtures	32	30
Sodium nitrate	80	80
All other	33	35
Total	294	302
Exports		
Ammonium nitrate	17	54
Ammonium sulfate	168	150
Urea	18	20
Ammonium phosphate	9	17
All other	56	80
Total	268	321
NET DOMESTIC SUPPLY	2,288	2,400

[1]See "Basis for Estimates" in this report for sources of basic data and method of making estimates.
[2]Revised.

monia distributors. The ammonia loses its identity in the last or next to last step in the distribution channel, hence the inclusion of ammonia and ammonia-water solutions in one group.

Liquid fertilizers, ammoniating solutions, nitrogen (fertilizer) solutions, all are terms which frequently need definition. Actually liquid nitrogenous materials include anhydrous ammonia, aqua ammonia, ammonium nitrate-water solution, and combinations of ammonia, ammonium nitrate and urea dissolved in water. In some cases materials such as sodium nitrate may be used. All liquids, with the exception of anhydrous ammonia (including aqua), have been grouped into "all other" for purposes of this report. Liquid nitrogen materials are variously grouped into non-pressure, low-pressure and high-pressure; ammoniacal and non-ammoniacal; or ammoniating and non-ammoniating. The breakdown chosen for this report is that for which statistics are available for making more reliable estimates. The Bureau of the Census started monthly publication of data on ammoniating solutions in January 1958.

Estimates made for this report indicate that about 50 percent of the N for formulating "all other" liquid nitrogen materials was supplied from ammonia, about 43 percent from ammonium nitrate and 7 percent from urea. The Fertilizer Investigations Research Branch, Soils and Water Conservation Research Division, ARS, U. S. Department of Agriculture, made a study in 1957 which revealed that 20 domestic companies were making nitrogen solutions which fall in the category "all other," and that more than 50 such formulations were being sold.*

Synthetic ammonia capacity totaled about 3,900,000 tons of N on January 1, 1958. Additional plants are under construction, capacity for about 200,000 tons of N being expected to come on stream during the year.

A recent survey of urea production and distribution is to be reported in the near future by the Business and Defense Services Administration, U. S. Department of Commerce.

P_2O_5

The estimated supply of phosphate (P_2O_5) for fertilizer purposes in 1957-58 is 2,235,000 tons (table 2). The domestic supply of normal and enriched superphosphate will be about 133,000 tons of P_2O_5 less than in 1956-57. The quantity of concentrated superphosphate together with "other phosphates" from domestic sources will be greater than last year. Some increase is expected in both imports and exports. However, it is believed that the net quantity of P_2O_5 available for fertilizers in the United States will be 4.3 percent less than in 1956-57.

The use of phosphoric acid (H_3PO_4) as a source of P_2O_5 seems to be growing. The acid is used for direct application and for manufacture of both liquid and solid mixed fertilizers. It is estimated that approximately 25,000 tons of P_2O_5 (from phosphoric acid) were available for the above uses in addition to that used in the manufacture of concentrated superphosphate and ammonium phosphates.

In-place capacity for producing concentrated superphosphate by plants with phosphoric acid facilities is estimated to have totaled about 975,000 tons of P_2O_5 on January 1, 1958. Other plants with acid facilities which are engaged primarily in production of other phosphatic fertilizers may produce some concentrated superphosphate. Also, concentrated superphosphate is produced in a number of normal superphosphate plants from purchased acid.

The number of ammonium phosphate producers is growing. It is estimated that by mid-1958 ammonium phosphate plants capable of producing about 316,000 tons of P_2O_5 per year will be in operation.

K_2O

Delivery rates of potash (K_2O) during the first seven months of the fertilizer year lagged behind those of the past three years. The supply of potash delivered to the domestic fertilizer trade during 1957-58 is expected to be 1,871,000 tons or 6.7

percent less than in 1956-57 (table 3). The delivery rate toward the end of the fertilizer year is limited by distances from mines to fertilizer plants, availability of transportation facilities, and rate of inventory turnover in fertilizer plants.

Expansions by some of the older companies as well as developments by new companies within the last two years have swelled domestic potash production capacity to an estimated 2,500,000 tons of K_2O per year.

Active development of potash deposits in the province of Saskatchewan, Canada, adds to the supply on the North American continent. Six major U. S. potash producers as well as some Canadian and European firms have obtained licenses to prospect. Two of the U. S. firms are actually constructing mining facilities in Canada.

Basis for estimates

Government agencies publish information on production, shipments and consumption in manufacturing plants of many of the materials used for fertilizer purposes. Unfortunately, these data are not published in a form which will reflect total quantities of plant nutrients available. The figures for total plant nutrients and individual materials which are given herein were determined from analyses of published data supplemented by estimates for materials not included in published reports.

The U. S. Bureau of the Census at present publishes annual production (calendar year basis) of anhydrous ammonia, aqua ammonia, solid ammonium nitrate, ammoniating solutions (including urea) and synthetic ammonium sulfate.[1] The U. S. Tariff Commission publishes monthly production of total urea and annual production of urea for fertilizer purposes.[2]

Production of other solid nitrogen fertilizers and anhydrous ammonia (including aqua) for fertilizer manufacture and direct application were estimated for 1955 and 1956. The percentage of the anhydrous ammonia production which went into each type of nitrogenous fertilizer material was determined. Anhydrous ammonia production was projected for 1957-58 by expanding six months' production on the basis of the monthly rate for the past three years and adjusting for average inventory balances. The total N was broken down through use of product percentages on a calendar year basis. The U. S. Bureau of Mines publishes monthly production figures for by-product ammonium sulfate and ammonia liquor.[3] These were projected on a fiscal year basis in the same way as anhydrous ammonia production. Nitrogen available from natural organics was estimated.

Monthly data are published by the Bureau of the Census on production of normal and enriched superphosphate, concentrated superphosphate and other phosphates.[4] It was necessary to estimate the quantities of P_2O_5 from natural organics, and the amount of phosphoric acid used for direct application, in liquid mixed fertilizers and in manufacture of granular fertilizers.

Data on basic slag and phosphate rock are based on annual fertilizer consumption reports of the Department of Agriculture.[5] The foreign trade in phosphate rock was not included because, except for the quantity used for direct application, this material is converted to other forms of P_2O_5 before being made available for fertilizer purposes.

Estimates of supply of potash are based on data from the American Potash Institute showing deliveries of this material to the fertilizer trade and on data from the Bureau of Mines.[6] The delivery pattern appears to be changing, with a larger percentage of material being delivered in the last five months of the fertilizer year. Deliveries during the

Table 2.—PHOSPHATE: estimated supply of P_2O_5 for fertilizer purposes 1956-57 and 1957-58, United States and possessions[1]

ITEM	1956-57[2]	1957-58
Supply from domestic sources	(1,000 short tons of available P_2O_5)	
Normal and enriched	1,446	1,313
Concentrated	799	875
Ammonium phosphate	144	155
All other	149	150
Total	2,538	2,493
Imports		
Ammonium phosphate	39	45
All other	15	17
Total	54	62
Exports		
Normal	73	51
Concentrated	128	176
Ammonium phosphate	25	48
All other	31	45
Total	256	320
NET DOMESTIC SUPPLY	2,336	2,235

[1]See "Basis for Estimates" for sources of basic data and method of making estimates.
[2]Revised.

Table 3.—POTASH: estimated supply of K_2O for fertilizer purposes, 1956-57 and 1957-58, United States and possessions[1]

ITEM	1956-57[2]	1957-58
Supply from domestic sources	(1,000 short tons K_2O)	
Muriate	1,982	1,806
Sulfates	137	112
Manure salts	3	1
All other	20	20
Total	2,142	1,939
Imports		
Muriate	142	158
Sulfates	25	23
All other	12	14
Total	179	195
Exports		
Muriate	260	215
Sulfates	34	17
All other	21	31
Total	315	263
NET DOMESTIC SUPPLY	2,006	1,871

[1]See "Basis for Estimates" for sources of basic data and method of making estimates.
[2]Revised.

Table 4.—Percentage of synthetic ammonia production, capacity, fertilizer nitrogen use, and harvested acreage of 59 principal crops, by regions in the continental United States.

Region	Synthetic ammonia capacity Jan. 1, 1958	Nitrogen used		Harvested acreage of 59 principal crops 1955
		year ended June 30, 1950	year ended June 30, 1956	
	percent[1]	percent[2]	percent[2]	percent[3]
North Atlantic	4.2	8.3	6.2	4.5
South Atlantic	23.0	30.2	21.8	7.0
East North Central	15.4	9.9	14.3	18.3
West North Central	10.6	6.3	12.9	40.4
(North Central)	(26.0)	(16.2)	(27.2)	(58.7)
South Central	34.3	30.1	26.1	18.2
Western	12.5	15.2	18.7	11.6
Total United States	100.0	100.0	100.0	100.0

[1]Based on data from the Business and Defense Services Administration, U. S. Department of Commerce.
[2]Based on fertilizer consumption reports of the Fertilizer Investigations Research Branch, Soil and Water Conservation Research Division, ARS., U. S. Department of Agriculture.
[3]Based on data from Agricultural Statistics—1956, U. S. Department of Agriculture.

Table 5.—Aerial application of fertilizer in continental United States, 1955 and 1956[1]

Year	Acres treated	Dry fertilizers	Liquid fertilizers	Flight hours	Acres per hour
		(pounds)	(gallons)		
1955	2,576,000	325,984,000	809,000	62,550	41.2
1956	2,393,000	295,405,000	867,000	62,890	38.0

[1]CAA Office of Flight Operations and Airworthiness, Annual Survey of Aerial Work Aviation Activities.

first seven months of this year seemed to be in line with the changing pattern. Therefore, estimates for 1957-58 were based on the pattern of the last fiscal year.

Exports and imports are based on data published monthly by the U. S. Bureau of the Census.[7] Data for 1957-58 were projected on the basis of the rate of export or import of commodities during the first six months of the previous fertilizer year. The procedure for projecting exports and imports is probably less reliable than the method for determining availability of materials from domestic production. Ocean schedules are less predictable, therefore some items were adjusted on the basis of trends in annual deliveries over the last three years.

In addition to other sources of basic data cited here, a comprehensive and very useful report was issued during the past year. It is "Statistics on Fertilizers and Liming Materials in the United States," U. S. Department of Agriculture, Statistical Bulletin No. 191, April 1957.

Potential fertilizer markets

Considerable interest has been shown in the possibility of increasing forest products production by fertilizer applications. More land is used for commercial forest (485 million acres) than is used for the principal harvested food and fiber crops (333 million acres). Nearly one million acres per year are being planted to trees.

The Federal highway program will change the use of over one million acres of land in addition to that actually paved. Turf and shrubbery along roadsides will prevent erosion and can be established with much greater success through use of fertilizer, particularly on subsoil or soils having low fertility levels.

Use of fertilizer by gardeners and on cemeteries, recreation facilities, and other off-the-farm areas is taking an estimated 10 percent of total fertilizer consumption. Reliable sources indicate that off-farm use will increase greatly in the next few years.

As future agricultural requirements of an expanding population have to be met and higher nutritional standards achieved, it will be necessary to increase fertilizer applications on larger acreages of cropland. For example, about 59 percent of the harvested acreage of the 59 principal crops in this country is located in the North Central States (table 4). Soil tests show that plant nutrient levels in the soils of the area are inadequate for optimum crop production. Farmers there already are increasing their use of nitrogen (table 4).

Methods of applying fertilizers on the land have improved considerably since the days of the mule-drawn spreader. The use of mechanized equipment in applying both solid and liquid materials speeded up the operation, and airplanes reduced even more the time required to apply fertilizers. More than two million acres were fertilized by airplane in 1955 and 1956 (table 5).

REFERENCES

*Association of American Fertilizer Control Officials, Official Publication, No. 11:66-69(h)(1957).

[1]Facts for Industry, Inorganic Chemicals and Gases, Series M28A, Bureau of the Census, U. S. Department of Commerce.
[2]Facts for Industry, Organic Chemicals and Plastics Materials, Series 6-2-168 (a monthly report); and Synthetic Organic Chemicals—United States Production and Sales (an annual report), Chemical Division, U. S. Tariff Commission.
[3]Coke and Coal Chemicals, Monthly Coke Reports, Mineral Industry Surveys, Bureau of Mines, U. S. Department of the Interior.
[4]Facts for Industry, Superphosphate and Other Phosphatic Fertilizers, Series M28-D, Bureau of the Census, U. S. Department of Commerce.
[5]Commercial Fertilizers and Primary Plant Nutrients, Consumption in the United States, Fertilizer Investigations Research Branch, Soil and Water Conservation Research Division, ARS, U. S. Department of Agriculture.
[6]Minerals Market Reports, Minerals Industry Surveys, Bureau of Mines, U. S. Department of the Interior.
[7]United States Exports of Domestic and Foreign Merchandise, Report No. FT 410; United States Imports of Merchandise for Consumption, Report No. FT 110; Foreign Trade Division, Bureau of the Census, Department of Commerce.

Bastien Heads Quebec Group

P. E. Bastien, Quebec district sales manager of the fertilizer and feeds division of Canada Packers Ltd., Montreal, was elected chairman of Quebec Fertilizers Inc. at the annual meeting of the organization.

Other officers elected were: vice-president—George R. Blais, assistant Quebec district sales manager, agricultural chemicals division, Canadian Industries Limited; executive director—Ronald Olivier, general manager, William Houde Limited; secretary-treasurer — L. E. Whitworth, International Fertilizers Limited; agronomic committee chairman—Jean Leclerc, Canadian Industries Limited; advertising committee chairman—Real Roy, Canada Packers Ltd.

Critical Cotton Situation Forecast

National Cotton Council's executive vice-president, Rhea Blake forecast a critical situation in cotton unless changes are made in the Federal farm program which will allow production of adequate supplies of cotton at competitive prices. There is now a shortage of better quality US cotton, and this will become even more serious with a cutback in the 1959 crop, forcing mills to use lower cotton grades, or turn to rayon.

Consumption of

COMMERCIAL FERTILIZERS and Primary Plant Nutrients in the U. S., year ended June 30, 1957

by

WALTER SCHOLL, MARION M. DAVIS, FLORENCE B. CRAMMATTE, ESTHER I. FOX, AND ANNA W. WOODARD
Fertilizer Investigations Research Branch
Soil and Water Conservation Research Division
Agricultural Research Service
U. S. Department of Agriculture, Beltsville, Maryland

INTRODUCTION

The consumption of fertilizers and their primary plant nutrient (N, P_2O_5, K_2O) content are shown for the United States, by individual States, the District of Columbia, Hawaii, and the Commonwealth of Puerto Rico, for the year ended June 30, 1957 in this 18th report. Data on consumption of fertilizers in other possessions are difficult to obtain accurately and are insignificant when compared to the total for the United States. For example about 600 tons of fertilizers are being used annually in Alaska but are not included in this report.

The data presented in tables 1 through 13 were compiled from information furnished by manufacturers showing the tonnage of each grade shipped to agents, dealers, and consumers in all the areas tabulated except California, Florida, Massachusetts, Missouri, North Carolina, South Carolina, Texas, and Virginia. The data for these States were compiled chiefly from the reports of the fertilizer control officials of the respective States. Supplementary information was supplied by State agencies, as well as by fertilizer brokers. Special inquiries were made of all known distributors and custom applicators of anhydrous ammonia and nitrogen solutions.

The quantities of N, P_2O_5, and K_2O shown in this report are based on the average analyses of samples of the products by fertilizer control officials for the State in which they were consumed, rather than on the manufacturers' guarantees. Thus, the overruns or underruns of nutrients from the guarantees are taken into account. This gives more nearly the actual tonnages of nutrients consumed than the guarantees would.

The comparisons of the changes in fertilizer consumption are based on the tonnages of fertilizers containing primary nutirents, in order that a direct comparison may be made with the change in the quantities of N, P_2O_5, and K_2O consumed.

Quantities are reported as 2,000-pound tons. Although the data refer to shipments, the terms "consumption," "sales," and "shipments" are used synonymously. Actual consumption differs slightly, no doubt, from either shipments or sales.

ALL FERTILIZERS

The total quantity of the various kinds of fertilizers consumed in the year ended June 30, 1957, amounted to 22,709,011 tons (table 1). This quantity included the secondary and trace nutrient materials and increased 515,041 tons from the 22,193,970 tons, revised, used in the preceding year. The 1956-57 consumption of fertilizers comprised 21,765,768 tons of products containing one or more of the primary nutrients, and 943,243 tons of the secondary and trace nutrient materials which did not contain N, P_2O_5, or K_2O. The quantity of fertilizer containing primary nutrients was 361,403 tons (1.7 percent) above that (21,404,365 tons revised) in 1955-56. Consumption of the secondary and trace nutrient materials was 153,638 tons (19.5 percent) above the quantity (789,605 tons) used in the preceding year.

The changes in consumption of the classes of fertilizers containing primary nutrients from 1955-56 is summarized by regions in table 2.

Unlike the year 1955-56 when consumption of fertilizers in most of the regions was lower than in 1954-55, consumption in 1956-57 was higher than in 1955-56 in all but a few regions. In the few exceptions where consumption was lower, the amount of decrease was usually not as great as occurred the previous year. Consumption of mixtures in the South Central region has continued to decrease which was offset, in part, by a higher use of materials. Only in the Pacific region has consumption of both classes increased and in the South Atlantic region, decreased in the two years, respectively.

Consumption of fertilizers containing primary nutrients increased in 36 of the tabulated areas and decreased in 15 (table 3). In comparison with consumption in 1955-56, increases ranged up to 37 percent for Montana while decreases ranged downward to 20 percent for Oklahoma. In tabulated areas showing increased consmuption, the average was 6.0 percent while in those areas showing decreases, the average was 4.5 percent resulting in a weighted average increase of 1.7 percent for the United States. The tonnage of fertilizers consumed was noticeably, although not significantly, higher in most of the northern and western States, while the southeastern States generally consumed lower amounts.

Compared with consumption in each six-month period of 1955-56, the tonnage of mixtures and materials in the July-December period was higher by 158,467 and 241,170 tons, respectively. Consumption in the January-June period was 231,313 tons (2.1 percent) lower in mixtures and 193,079 tons (4.3 percent) higher in materials exclusive of secondary and trace nutrient materials listed in table 1. Total changes for the year were a decrease of 72,846 tons in mixtures and an increase of 434,-249 tons in materials. The proportionate increase of materials in the January-June period was but 4.3 percent as compared with 11.2 percent in the July-December period.

MIXTURES

In 1956-57 the total consumption of commercial mixtures amounted to 14,702,807 tons (table 3). There were 1,690 grades reported. In addition, over 500 mixtures, not reported by grades, were used in California and an unknown number reported as miscellaneous tonnages by manufacturers in other States. Mixtures consumed in 1956-57 represented 64.7 percent of the quantity of all fertilizers compared with 66.6 percent for the preceding year.

The total consumption of mixtures in 1956-57 was 72,846 tons (0.5 percent) lower than in 1955-56, compared to a large decrease (572,197 tons) in 1955-56 from 1954-55. In 1956-57, a cumulative increase of

Table 1.—Kinds of fertilizers consumed in regions, year ended June 30, 1957[1]

Tons

Kind	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories 2/	Total 3/
MIXTURES: N-P-K	333,640	1,637,694	4,429,274	3,033,202	1,006,010	1,734,143	574,776	29,276	260,812	258,637	13,297,464
N-P	37	188	1,154	45,467	133,250	265	33,082	27,009	84,675	6,271	331,398
P-K	29,614	107,624	187,204	238,527	80,568	174,520	24,616	73	1,681	4,025	848,452
N-K	2	77	194,774	121	291	2,663	0	32	970	26,563	225,493
CHEMICAL NITROGEN MATERIALS											
Ammonia, anhydrous	0	2,100	21,820	34,542	96,924	57,450	105,836	32,786	100,340	904	452,702
Ammonia, aqua: 19-25% N	0	0	0	2,288	2,854	258	1,614	16,904	285,503	72,011	381,432
Ammonium nitrate 4/	7,396	27,855	122,258	124,567	213,989	328,071	139,798	44,689	96,573	0	1,105,196
Ammonium nitrate-limestone mixtures	61	1,607	256,110	805	126	40,002	463	1,117	295	0	300,586
Ammonium sulfate	333	3,789	5,680	92,115	6,835	5,629	75,704	56,210	207,783	62,105	516,183
Calcium cyanamide	1,341	8,799	9,762	1,383	41	9,396	6,816	1,051	8,389	0	46,978
Calcium nitrate	6	3	6,287	0	0	0	2	9,110	35,083	42	50,533
Nitrogen solutions: 19-45% N	224	2,955	75,941	38,147	50,374	8,854	17,688	5,879	45,816	0	245,878
Sodium nitrate	1,492	10,627	280,531	1,288	67	150,495	47,637	576	320	126	493,159
Urea	1,228	2,757	5,425	13,773	7,375	1,172	13,477	21,709	27,084	14,916	108,916
Other	60	719	2,123	264	287	28	408	970	6	0	4,865
NATURAL ORGANIC MATERIALS											
Blood, dried	3	13	19	0	1	0	1	12	3,354	0	3,403
Castor pomace	1,897	110	2,601	0	0	0	1,145	0	844	0	6,597
Compost 5/	0	83	2	3,231	96	92	1,721	0	745	0	5,970
Cottonseed meal 5/	7,641	81	2,021	4	0	150	407	0	0	0	10,304
Fish scrap, meal, emulsions	343	4	0	0	0	0	0	2	1,375	0	1,724
Manures, dried	4,279	12,233	2,886	8,037	2,354	1,094	2,773	9,674	250,911	1	294,242
Sewage sludge, activated	5,554	12,575	7,702	28,254	7,356	1,270	2,138	5,139	23,114	50	93,152
Sewage sludge, other	0	75	0	593	97	0	0	0	36,812	0	37,577
Tankage, animal	3	91	0	433	0	0	0	0	0	0	527
Tankage, process	3,660	8,494	3,531	363	213	4	0	0	1,639	0	17,904
Other	846	120	2,622	33	0	0	8	73	4,569	0	8,271
PHOSPHATE MATERIALS											
Ammonium phosphate: 11-48 6/	0	481	0	7,919	28,657	184	2,067	7,554	14,710	2,313	63,885
" " 13-39 6/	0	0	0	687	16,603	6	18,061	4,312	5,987	0	45,656
Ammonium phosphate sulfate: 16-20 6/	0	6	0	753	56,575	76	60,653	40,536	100,848	238	259,685
Ammonium phosphate nitrate: 27-14 6/	0	0	0	0	812	0	0	3,963	6,289	0	11,064
Ammoniated superphosphate 7/	0	115	121	0	0	0	0	0	6,108	531	6,875
Basic slag	0	0	22,955	0	0	136,734	2,973	0	0	0	162,662
Bonemeal: raw and steamed	1,372	3,417	1,536	1,866	148	477	630	1	2,559	0	12,006
Calcium metaphosphate	0	619	3,119	10,282	15,279	14,685	1,168	133	34	0	45,319
Diammonium phosphate: 21-53 6/	0	89	1,293	2,097	6,360	1,888	3,141	4,707	205	0	19,780
Phosphoric acid: 51-55% P_2O_5	0	0	0	0	0	0	1,603	7,818	8,637	0	18,058
Phosphate rock	335	6,368	27,991	547,697	209,888	11,831	9,984	0	1,119	4,357	819,570
Colloidal phosphate	0	40	679	1,631	3,810	8,284	1,725	0	444	0	16,613
Superphosphate: 18%	7,016	11,083	22,833	22,628	21,461	19,487	0	852	0	20	105,380
" 19%	142	40	2,756	87	3,004	1,339	0	6,325	76,506	0	90,799
" 20-22%	23,046	62,958	29,301	45,422	26,489	80,433	77,311	12,005	0	6,854	363,819
" 23-41%	0	3,247	0	1,991	409	0	231	338	0	0	6,216
" 42-44%	0	0	0	0	30,220	0	0	37,538	0	2	67,760
" 45%	6	4,719	12	51,986	79,015	2,106	32,567	33,043	23,659	250	227,363
" 46%	41	156	234	7,437	26,766	4,504	11,965	5,799	0	4,418	61,320
" 47-48%	10	33	365	2,587	2,730	1,676	2,915	0	0	0	10,316
" 49-52%	0	43	0	703	129	114	5	0	0	0	994
Other	177	1	379	0	118	106	42	0	0	0	823
POTASH MATERIALS											
Cotton hull ashes	378	100	0	67	0	0	0	0	0	0	545
Lime-potash mixtures 8/	0	185	21,688	0	0	10,200	0	0	0	0	32,073
Manure salts: 21-26% K_2O	0	9	539	43	0	0	465	316	0	0	1,372
Potassium chloride: 48-52% K_2O	4	13	0	2,405	513	2,296	382	25	0	0	5,638
" " 58-62% K_2O	1,852	4,138	40,561	172,362	41,587	50,997	37,017	944	5,905	15,168	370,531
" magnesium sulfate	155	981	1,860	2,701	408	1,137	30	59	340	8	7,679
" sodium nitrate 7/	0	0	9,278	4	0	0	0	51	0	40	9,373
" sulfate	141	1,437	5,915	1,918	519	6,692	156	1,100	6,106	2,340	26,324
Other	160	6	7,009	3	90	0	79	17	0	0	7,364
TOTAL: PRIMARY NUTRIENT FERTILIZERS	434,495	1,940,957	5,820,151	4,552,713	2,180,698	2,870,808	1,315,280	430,327	1,738,149	482,190	21,765,768
SECONDARY & TRACE NUTRIENT MATERIALS											
Aluminum sulfate 5/	2	6	2	0	0	0	0	0	90	0	100
Borax 5/	77	285	767	209	85	301	34	1	543	0	2,302
Calcium sulfate (gypsum)	272	3,940	104,265	220	3,449	1,930	167	19,383	757,665	26	891,317
Copper sulfate 5/	0	50	303	30	3	0	0	0	154	0	540
Iron sulfate 5/	0	0	32	0	3	0	0	596	4,433	2,494	7,558
Magnesium sulfate 5/	19	214	1,807	115	89	0	0	0	655	0	2,899
Manganese sulfate 5/	5	116	218	1,238	5	0	0	30	122	0	1,734
Mixed minerals 5/	0	191	12	72	175	94	40	178	4,316	0	5,078
Sulfur: 25-99% S	15	70	104	29	23	1	1,562	1,891	16,491	2	20,188
Sulfuric acid: 40-93%	0	0	0	0	0	0	1,235	1,390	1,921	0	4,546
Zinc sulfate 5/	0	34	125	2	5	74	0	306	1,966	82	2,594
Other	0	1	0	109	0	0	0	0	4,277	0	4,387
SECONDARY & TRACE NUTRIENT MATERIALS	390	4,907	107,635	2,024	3,837	2,400	3,038	23,775	792,633	2,604	943,243
GRAND TOTAL	434,885	1,945,864	5,927,786	4,554,737	2,184,535	2,873,208	1,318,318	454,102	2,530,782	484,794	22,709,011

1/ Includes 6,003 tons of ammonium nitrate, 2,888 tons of diammonium phosphate, 5,861 tons of calcium metaphosphate, and 540 tons of superphosphate (47%) distributed by Government agencies for test demonstration. Does not include the quantities of materials used for the manufacture of the indicated quantities of commercial mixtures. 2/ Hawaii and Puerto Rico. 3/ The primary plant nutrient content of mixtures is shown in Table II, and of the principal materials in Table 2. 4/ Minor quantities may have been used for other purposes than fertilizer. 5/ Distributed by manufacturers of fertilizers. 6/ Includes quantities reported as mixtures. 7/ Additional quantities may have been reported as mixtures. 8/ Additional quantities are given free to farmers for which no records are kept.

395,607 tons of mixtures was reported for 30 tabulated areas and a decrease of 468,453 tons for 21 areas. Areas in which the consumption of mixtures were generally lower than in 1955-56 were those located in the East North Central and southeastern regions of the United States.

The N-P-K mixtures shown in table 1 represented 90.4 percent of the total tonnage of mixtures consumed, while consumption of the other classes (N-P, P-K, N-K) was 2.3 percent, 5.8 percent, and 1.5 percent, respectively. The N-P-K class was used in amounts representing more than 80 percent of the tonnage of mixtures in all regions except the Mountain and Pacific. In the Mountain region the tonnages of N-P-K and N-P mixtures were used in amounts representing 51.9 and 47.9 percent of the regional total, respectively, while in the Pacific region, these classes represented 74.9 and 24.3 percent, respectively.

In the continental United States, there were 175 grades consumed in individual amounts of 4,000 tons or more (table 4). These totaled 13,745,381 tons and accounted for 95.40 percent of the quantity of mixtures used on the Continent. Other grades consumed numbered 1,335 and amounted to 317,969 tons (2.21 percent). The balance (343,961 tons, 2.39 percent) represented mixtures not reported by grades.

Consumption of mixtures in Hawaii and Puerto Rico amounted to 295,496 tons in 180 grades. While many of the grades in Puerto Rico are similar to those used on the Continent, most of those in Hawaii are designated in fractional numbers.

The 15 grades consumed in largest tonnages in 1956-57 in each of the Continental regions and Puerto Rico are shown in table 5, together with the quantities for each State in the region. At least 11 of the grades in each area were among the 15 consumed in largest tonnages the preceding year, but not always in the same relative order of tonnage. These grades, in 1956-57, accounted for 50 percent or more of the total consumption of mixtures in Puerto Rico and each of the States except California, Colorado, Florida, New Mexico, North Dakota, Washington, and Wyoming. The total tonnages of the 15 grades shown represented 62.1 percent of the total tonnage of mixtures consumed on the Continent. Approximately one percent of the number of grades used on the Continent represented nearly two-thirds of the total tonnage of mixtures consumed.

Table 2.—Regional change in consumption of fertilizers in year ended June 30, 1957, from that in the preceding year

Region	Change from previous year in consumption as—					
	Mixtures	Materials[1]	Total[1]	Mixtures	Materials[1]	Total[1]
	Tons	Tons	Tons	Percent	Percent	Percent
New England	15,723	2,830	18,553	4.5	4.1	4.5
Middle Atlantic	5,699	—4,006	1,693	.3	—2.0	.1
South Atlantic	—27,089	—9,653	—36,742	— .6	—1.0	— .6
East North Central	—62,532	102,646	40,114	—1.8	9.1	.9
West North Central	38,322	80,429	118,751	3.2	9.1	5.8
East South Central	—69,110	41,228	—27,882	—3.5	4.5	—1.0
West South Central	—70,615	19,639	—50,976	—10.0	3.0	—3.7
Mountain	8,514	61,314	69,828	17.8	20.0	19.4
Pacific	39,240	102,596	141,836	12.7	8.0	8.9
Continental U. S.	—121,848	397,023	275,175	— .8	6.1	1.3
Territories	49,002	37,226	86,228	19.9	24.9	21.8
Total	—72,846	434,249	361,403	— .5	6.6	1.7

[1]Excluding the quantity of secondary and trace nutrient materials.

In 1955-56 and 1956-57 the 5-10-10 grade was consumed in largest tonnage. Grade 4-12-12 was next in 1956-57 having replaced the 3-12-12 grade which for six years through 1954-55 had been the first grade in tonnage. Though the 5-10-10 grade was consumed in largest tonnage in 1956-57, it represents the class having the ratio of 1:2:2. Grades with a ratio of 1:4:4 (table 6) were most often used in the continental United States in 1956-57 but the second ranking ratio represents the most widely used 5-10-10 grade. The cumulative tonnages of all grades reported in ratios of the 10 listed accounted for 73.5 percent of the total tonnages of mixtures consumed on the Continent in 1956-57.

The national weighted average of the primary nutrients contained in mixtures in 1956-57 was 5.74 percent N, 12.36 percent available P_2O_5, and 11.44 percent K_2O, a total of 29.54 percent (table 7). The corresponding values in the preceding year were 5.39, 12.08, 11.20, and 28.67 percent. The proportionate increase was highest for N (6.49 percent), while that for available P_2O_5 was but 2.32 percent, and for K_2O only 2.14 percent.

Compared with 1955-56 the average primary nutrient content of all mixtures consumed in each of the 51 tabulated areas in 1956-57 showed N increases in 40 and decreases in 11, available P_2O_5 increases or no change in 38 and decreases in 13, K_2O increases or no change in 39 and decreases in 12. As in the preceding year, the West South Central region was the only area in which the average content of each of the nutrients showed an increase in each State. The average grade of mixture consumed in the Pacific region contained 11.9 percent less K_2O in 1956-57 than in the preceding year.

MATERIALS

In 1956-57 the total consumption of materials for direct application amounted to 8,006,204 tons (table 8) which represented 35.3 percent of all fertilizers used compared with 33.4 percent for the preceding year. In 1956-57 the quantity of materials consumed was 587,887 tons (7.9 percent) more than the revised amount (7,418,317 tons) used in 1955-56. There were 168 grades and types of materials reported. The changes in consumption of the individual classes of materials have been summarized in table 9.

Compared with the previous year, the principal changes in consumption of the direct application materials were in the chemical nitrogen materials. Changes have been shown for the individual products of this class in table 10.

While there are variations in the changes in consumption of individual products and in States, the regional total use of chemical nitrogen materials was from 5 to nearly 52 percent higher in 1956-57 than for the previous year. Of the individual products the highest proportional use (125.8 percent) was in nitrogen solutions. In the South Atlantic region which has been slow in adopting liquid fertilizers of all kinds, the use of nitrogen solutions increased from 27,158 tons in 1955-56 to 75,941 tons in 1956-57. The uses of ammonium sulfate and ammonium nitrate were noteably higher in 1956-57. The use of ammonium sulfate increased in the East North Central region, particularly in Illinois and Indiana; while that of ammonium nitrate increased in all areas except the Pacific region and Hawaii where slight

Table 3.—Fertilizers consumed as mixtures and as separate materials, year ended June 30, 1957, compared with consumption of previous year, by State and region

State and region	Mixtures			Materials[1]			Grand total	Comparison with year ended June 30, 1956	
	July 1 - Dec. 31, 1956	Jan. 1 - June 30, 1957	Total	July 1 - Dec. 31, 1956	Jan. 1 - June 30, 1957	Total		Fertilizer consumption [2]	Total N, avail. P_2O_5 & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	13,520	149,789	163,309	2,518	6,288	8,806	172,115	94	95
New Hampshire	2,329	12,798	15,127	953	3,309	4,262	19,389	119	125
Vermont	4,277	33,744	38,021	13,669	3,722	17,391	55,412	109	112
Massachusetts	13,579	55,312	68,891	5,849	11,990	17,839	86,730	117	123
Rhode Island	1,840	13,119	14,959	426	1,501	1,927	16,886	113	116
Connecticut	10,145	52,841	62,986	4,163	17,204	21,367	84,353	110	113
New England	45,690	317,603	363,293	27,578	44,014	71,592	434,885	104	106
New York	104,227	394,806	499,033	23,814	55,229	79,043	578,076	101	105
New Jersey	52,945	192,612	245,557	6,728	16,221	22,949	268,506	102	101
Pennsylvania	158,500	410,007	568,507	19,881	45,934	65,815	634,322	97	100
Delaware	13,294	69,594	82,888	942	3,743	4,685	87,573	102	103
District of Columbia	364	1,406	1,770	291	521	812	2,582	101	94
Maryland	65,364	210,303	275,667	4,779	11,985	16,764	292,431	104	105
West Virginia	13,909	58,252	72,161	2,878	7,335	10,213	82,374	97	99
Middle Atlantic	408,603	1,336,980	1,745,583	59,313	140,968	200,281	1,945,864	100	103
Virginia	142,596	524,735	667,331	11,532	93,000	104,532	771,863	99	101
North Carolina	195,847	1,019,862	1,215,709	52,714	298,874	351,588	1,567,297	92	98
South Carolina	89,581	476,411	565,992	33,359	218,715	252,074	818,066	95	96
Georgia	206,299	841,434	1,047,733	37,564	208,145	245,709	1,293,442	101	100
Florida	549,230	766,411	1,315,641	65,722	95,755	161,477	1,477,118	110	112
South Atlantic	1,183,553	3,628,853	4,812,406	200,891	914,489	1,115,380	5,927,786	99	103
Ohio	271,289	681,739	953,028	18,509	64,160	82,669	1,035,697	99	103
Indiana	265,504	617,687	883,191	38,501	165,214	203,715	1,086,906	102	104
Illinois	162,468	351,368	513,836	446,104	409,022	855,126	1,368,962	101	108
Michigan	172,080	405,730	577,810	15,632	43,253	58,885	636,695	101	104
Wisconsin	65,047	324,405	389,452	9,497	27,528	37,025	426,477	103	106
East North Central	936,388	2,380,929	3,317,317	528,243	709,177	1,237,420	4,554,737	101	105
Minnesota	69,189	256,902	326,091	24,548	75,508	100,056	426,147	116	116
Iowa	47,562	259,899	307,461	39,467	121,284	160,751	468,212	104	105
Missouri	179,584	262,904	442,488	156,165	203,623	359,788	802,276	99	107
North Dakota	6,673	23,336	30,009	12,551	39,185	51,736	81,745	118	117
South Dakota	1,640	8,090	9,730	2,391	12,454	14,845	24,575	92	92
Nebraska	3,703	21,016	24,719	23,071	121,942	145,013	169,732	128	130
Kansas	47,170	32,451	79,621	65,703	66,524	132,227	211,848	102	105
West North Central	355,521	864,598	1,220,119	323,896	640,520	964,416	2,184,535	106	110
Kentucky	68,803	368,191	436,994	21,526	83,706	105,232	542,226	101	104
Tennessee	99,649	323,953	423,602	34,276	87,235	121,511	545,113	106	106
Alabama	132,292	617,251	749,543	64,197	225,624	289,821	1,039,364	94	99
Mississippi	21,284	280,168	301,452	198,732	246,321	445,053	746,505	100	103
East South Central	322,028	1,589,563	1,911,591	318,731	642,886	961,617	2,873,208	99	103
Arkansas	23,358	117,346	140,704	36,186	149,348	185,534	326,238	90	92
Louisiana	37,361	117,080	154,441	35,959	98,166	134,125	288,566	95	100
Oklahoma	29,424	32,577	62,001	25,359	20,763	46,122	108,123	80	85
Texas	89,770	185,558	275,328	112,668	207,395	320,063	595,391	105	115
West South Central	179,913	452,561	632,474	210,172	475,672	685,844	1,318,318	96	102
Montana	789	3,118	3,907	10,597	29,416	40,013	43,920	137	141
Idaho	453	7,529	7,982	24,208	53,203	77,411	85,393	130	126
Wyoming	263	1,005	1,268	674	8,501	9,175	10,443	93	96
Colorado	1,736	8,989	10,725	10,781	37,671	48,452	59,177	110	116
New Mexico	201	1,379	1,580	6,419	29,645	36,064	37,644	130	127
Arizona	7,346	17,290	24,636	57,483	95,984	153,467	178,103	117	116
Utah	572	4,352	4,924	2,657	24,736	27,393	32,317	105	100
Nevada	547	821	1,368	2,416	3,321	5,737	7,105	136	137
Mountain	11,907	44,483	56,390	115,235	282,477	397,712	454,102	119	119
Washington	6,255	30,626	36,881	56,428	91,266	147,694	184,575	108	106
Oregon	6,835	22,676	29,511	59,230	129,328	188,558	218,069	131	126
California	103,650	178,096	281,746	887,290	959,102	1,846,392	2,128,138	106	107
Pacific	116,740	231,398	348,138	1,002,948	1,179,696	2,182,644	2,530,782	109	109
Continental U. S.	3,560,343	10,846,968	14,407,311	2,787,007	5,029,899	7,816,906	22,224,217	101	105
Hawaii	34,703	30,725	65,428	63,398	65,610	129,008	194,436	118	117
Puerto Rico	109,334	120,734	230,068	25,321	34,969	60,290	290,358	125	121
Territories	144,037	151,459	295,496	88,719	100,579	189,298	484,794	122	119
Total: 1956-57	3,704,380	10,998,427	14,702,807	2,875,726	5,130,478	8,006,204	22,709,011	102	105
1955-56	3,545,913	11,229,740	14,775,653	2,508,638 [3]	4,909,679	7,418,317 [3]	22,193,970 [3]	100	100
1954-55	3,621,898	11,725,952	15,347,850	2,504,621	4,873,991	7,378,612	22,726,462	102	101

[1] Including ground phosphate, basic slag, secondary and trace nutrient materials, such as, borax, sulfur, magnesium sulfate, gypsum, etc., used as separate materials; also 15,292 tons of fertilizers distributed by Government agencies for test demonstrations. Does not include liming materials or quantities of materials used for manufacture of commercial mixtures. [2] Fertilizers which were guaranteed to contain one or more of the primary plant nutrients, (N, P_2O_5, K_2O). [3] Revised by addition of 900 tons of anhydrous ammonia to Wyoming total.

Table 4.—Principal grades of mixtures consumed in continental United States, year ended June 30, 1957, compared with consumption of previous year

Grade	Consumption 1/		Proportion of total		Grade	Consumption 1/		Proportion of total	
	1956	1957	1956	1957		1956	1957	1956	1957
	Tons	Tons	Percent	Percent		Tons	Tons	Percent	Percent
0-8-24	5,540	8,097	0.03	0.05	6-12-12	334,595	371,569	2.30	2.57
0-9-27	11,816	13,848	.08	.10	6-12-15	3,360	13,966	.03	.10
0-10-10	3,547	5,350	.03	.03	6-12-18	6,610	8,897	.04	.06
0-10-20	62,640	77,023	.43	.54	6-18-6	3,215	14,414	.02	.10
0-10-30	41,660	47,908	.29	.33	6-18-18	8,834	10,409	.07	.08
0-12-12	20,064	13,573	.13	.10	6-20-20	4,499	4,950	.03	.03
0-12-20	16,373	4,362	.12	.03	6-24-0	7,909	6,126	.05	.04
0-12-36	10,707	10,546	.07	.07	6-24-12	84,454	105,127	.58	.73
0-14-14	174,442	162,169	1.21	1.12	6-24-24	44,673	63,358	.31	.44
0-15-30	15,256	20,002	.10	.14	6-40-0	0	7,120	0	.05
0-15-45	4,879	5,633	.03	.04	7-5-7	0	6,561	0	.05
0-16-8	46,697	45,824	.33	.32	7-7-7	24,767	24,417	.17	.17
0-20-10	11,335	10,448	.07	.07	7-8-8	7,705	8,672	.05	.06
0-20-20	310,275	304,514	2.14	2.12	7-9-9	3,737	5,041	.03	.04
0-24-24	8,912	9,331	.06	.06	7-14-7	3,902	5,168	.03	.03
0-25-25	17,837	27,032	.12	.19	7-28-14	531	14,204	(2/)	.10
0-30-15	11,587	13,561	.08	.09	8-0-8	12,278	11,022	.08	.08
0-30-30	20,984	15,879	.15	.11	8-0-12	5,820	4,001	.04	.02
2-12-6	27,156	16,216	.18	.12	8-0-24	21,111	17,869	.15	.13
2-12-12	400,811	371,393	2.76	2.57	8-3-8	12,252	13,818	.08	.09
3-8-8	9,173	5,969	.06	.05	8-4-6	6,150	7,641	.04	.06
3-9-6	367,517	251,084	2.53	1.74	8-4-8	37,168	41,763	.26	.29
3-9-9	478,163	528,959	3.29	3.67	8-4-12	2,564	6.990	.02	.05
3-9-12	33,474	26,998	.24	.19	8-5-8	1,024	8,832	.01	.06
3-9-15	8,400	7,739	.05	.05	8-6-4	6,908	7,495	.05	.05
3-9-18	70,990	61,932	.49	.43	8-6-6	4,004	4,828	.02	.03
3-9-27	95,000	75,262	.66	.52	8-6-8	20,456	17,449	.14	.12
3-11-11	2,645	9,785	.02	.07	8-6-10	694	4,810	(2/)	.04
3-12-6	152,357	108,552	1.04	.75	8-8-2	2,518	4,202	.02	.03
3-12-12	1,171,479	908,575	8.07	6.31	8-8-4	16,218	15,536	.12	.10
3-18-9	41,699	36,428	.28	.25	8-8-8	207,987	221,474	1.43	1.54
4-4-2	5,050	8,274	.04	.06	8-9-10	8,164	10,699	.06	.08
4-6-6	8,503	10,635	.06	.07	8-10-12	11,169	9,230	.07	.06
4-6-8	38,981	43,788	.27	.31	8-12-0	2,712	4,829	.02	.03
4-7-5	115,248	118,792	.79	.82	8-12-12	55,748	59,701	.39	.42
4-8-4	11,311	12,340	.08	.09	8-12-16	16,119	9,238	.11	.06
4-8-6	190,357	143,180	1.31	.99	8-16-8	6,189	5,920	.04	.04
4-8-8	219,923	208,791	1.51	1.45	8-16-16	140,341	166,068	.97	1.16
4-8-10	115,008	87,176	.79	.60	8-24-0	5,479	10,220	.03	.07
4-8-12	53,139	74,057	.37	.52	8-24-8	72,908	62,403	.51	.43
4-8-16	2,566	4,894	.02	.03	8-24-12	13,576	18,643	.09	.13
4-9-3	63,442	52,208	.43	.36	8-32-0	60,377	56,439	.42	.39
4-10-6	368,797	105,956	2.54	.74	9-6-6	10,609	14,459	.07	.10
4-10-7	469,543	362,433	3.23	2.52	9-9-9	10,906	16,605	.07	.12
4-10-8	3,071	4,133	.03	.02	9-12-12	0	11,644	0	.08
4-10-10	10,657	17,075	.07	.12	9-36-0	3,006	11,279	.02	.08
4-12-4	84,300	61,625	.58	.43	10-0-10	22,687	21,182	.16	.14
4-12-8	146,648	148,832	1.01	1.03	10-0-12	3,700	4,327	.02	.03
4-12-12	737,215	949,433	5.07	6.59	10-4-10	4,808	5,020	.03	.04
4-16-8	23,225	22,371	.16	.16	10-5-5	3,657	5,217	.03	.03
4-16-16	615,596	527,812	4.24	3.66	10-5-10	1,501	4,475	.01	.04
4-24-12	24,865	19,557	.17	.14	10-6-4	42,175	59,507	.29	.41
5-3-2	610	4,697	(2/)	.03	10-10-0	8,445	4,496	.06	.03
5-3-6	3,559	4,502	.03	.03	10-10-5	22,569	26,279	.15	.18
5-5-6	2,086	4,946	.01	.03	10-10-10	659,090	689,131	4.54	4.79
5-5-8	7,085	7,063	.05	.05	10-16-8	8,274	6,754	.06	.04
5-6-8	9,399	10,264	.07	.07	10-20-0	63,825	53,834	.44	.38
5-7-5	22,008	22,311	.15	.15	10-20-5	2,967	5,451	.02	.03
5-8-7	10,294	9,743	.07	.07	10-20-10	121,165	140,494	.83	.98
5-8-8	5,307	7,007	.03	.05	10-20-20	23,440	29,195	.16	.20
5-10-5	678,083	604,630	4.67	4.19	10-30-10	4,684	5,224	.04	.04
5-10-10	1,296,912	1,407,706	8.93	9.78	12-0-10	13,570	16,846	.09	.12
5-10-15	128,086	150,218	.88	1.04	12-0-12	7,832	7,711	.06	.05
5-10-20	8,589	8,445	.06	.06	12-6-6	7,150	13,164	.05	.09
5-10-30	3,317	4,109	.02	.02	12-12-12	500,839	611,110	3.44	4.24
5-12-10	0	5,731	0	.04	12-24-0	4,597	4,404	.03	.03
5-15-8	127	5,774	(2/)	.04	12-24-12	26,762	29,958	.19	.21
5-15-30	6,298	5,988	.04	.05	12-36-12	4,729	5,193	.03	.04
5-20-10	58,433	73,446	.41	.51	13-13-13	38,058	44,801	.26	.31
5-20-20	699,511	787,324	4.81	5.46	14-0-14	47,436	54,770	.33	.38
5-40-0	5,966	7,725	.04	.05	14-14-14	43,913	45,114	.30	.31
6-3-6	14,094	11,508	.10	.08	15-0-14	1,410	6,032	.01	.04
6-4-6	19,139	20,022	.13	.14	15-0-15	4,902	9,756	.04	.07
6-4-8	43,944	59,255	.30	.41	15-8-4	7,815	6,497	.05	.05
6-6-6	85,327	95,018	.59	.66	15-10-10	1,705	4,953	.01	.03
6-6-8	31,430	37,781	.21	.27	15-15-0	31,462	19,351	.22	.13
6-6-12	9,934	12,033	.07	.08	15-15-15	2,481	27,695	.01	.20
6-6-18	11,070	9,832	.08	.07	15-30-0	4,174	4,236	.03	.03
6-7-7	4,126	4,121	.03	.03	16-8-8	3,052	6,287	.02	.04
6-8-4	104,043	8,339	.72	.05	16-48-0	5,092	15,342	.04	.11
6-8-6	123,735	130,846	.85	.91	17-7-0	16,192	21,061	.11	.14
6-8-8	268,288	278,438	1.85	1.94	19-38-0	1,642	9,384	.01	.07
6-8-12	24,559	16,979	.17	.11	20-0-20	6,417	9,729	.04	.06
6-9-3	5,280	4,398	.03	.03	20-20-0	2,830	7,003	.02	.05
6-9-6	8,802	7,580	.06	.06	24-20-0	350	4,414	(2/)	.03
6-9-12	36,971	24,767	.25	.17					
6-10-4	77,937	89,016	.54	.62	175 Listed grades	13,917,323	13,745,381	95.78	95.40
6-10-8	5,819	7,193	.04	.05	Other grades reported	3/ 414,040	4/ 317,969	2.85	2.21
6-12-4	3,944	4,439	.02	.03	Not reported by grade	197,796	343,961	1.37	2.39
6-12-6	41,708	34,330	.29	.24	Total	5/ 14,529,159	5/ 14,407,311	100.00	100.00

1/ Grades consumed in amounts of 4,000 tons or more in year ended June 30, 1957 and their consumption in year ended June 30, 1956. 2/ Less than 0.005 percent. 3/ 1,231 grades. 4/ 1,335 grades. 5/ Does not include the quantity of mixtures consumed in the Territories.

Table 5.—Mixtures consumed in States and regions, by grade, year ended June 30, 1957

New England

State	8-12-12	5-10-10	10-10-10	8-16-16	6-9-12	0-20-20	5-10-5	8-9-10	6-3-6	5-8-7	8-12-16	0-15-30	7-7-7	6-10-4	6-8-8	Other grades No. 1/	Other grades Tons 2/	Total tons
Maine	52,012	9,521	17,359	16,172	24,754	2,092	380	10,699	0	1,863	9,203	191	169	224	0	47	18,671	163,309
New Hampshire	919	2,406	2,378	4,993	13	498	136	0	0	656	0	1,208	548	339	0	27	1,033	15,127
Vermont	422	6,109	5,519	7,096	0	13,925	40	0	0	107	0	2,568	307	31	0	30	1,897	38,021
Massachusetts	1,455	16,865	10,405	5,638	0	581	2,537	0	3,734	4,684	0	1,410	4,412	2,695	1,103	22	13,372	68,891
Rhode Island	199	7,768	1,024	192	0	230	234	0	0	439	0	296	622	649	97	26	3,209	14,959
Connecticut	1,531	9,614	8,800	2,890	0	1,108	8,865	0	6,901	1,887	0	3,011	2,240	1,768	3,272	60	11,099	62,986
Total	56,538	52,283	45,484	36,981	24,767	18,434	12,192	10,699	10,635	9,636	9,203	8,684	8,298	5,706	4,472	88	49,281	363,293

Middle Atlantic

State	5-10-10	5-10-5	10-10-10	3-12-6	8-16-16	0-20-20	6-12-12	3-12-12	2-12-12	6-12-6	4-8-12	4-12-12	6-10-4	0-14-14	5-10-15	Other grades No. 1/	Other grades Tons 2/	Total tons
New York	139,783	107,655	61,770	2,856	46,820	16,196	14,497	2,657	27	26,469	2,582	74	8,624	2,322	7,393	75	59,308	499,033
New Jersey	124,025	24,370	9,774	1,060	2,391	2,539	5,469	1,633	68	1,341	492	415	6,371	2,967	1,871	77	60,771	245,557
Pennsylvania	256,960	20,771	60,639	49,280	29,435	32,966	8,281	15,382	6,983	1,592	7,318	14,972	5,042	4,542	1,665	113	52,679	568,507
Delaware	38,216	1,068	8,041	726	3,822	2,042	2,443	933	5,005	5	570	1,940	147	2,739	7,157	69	8,034	82,888
Dist. of Col.	24	990	3	0	0	6	0	0	0	0	6	0	288	0	0	13	453	1,770
Maryland	99,293	27,081	21,140	28,067	5,650	6,124	2,149	9,413	15,473	30	14,855	5,505	1,060	5,350	1,394	96	33,083	275,667
West Virginia	34,190	2,491	3,763	8,377	295	6,159	544	416	2,852	58	3	60	700	2,399	86	47	9,768	72,161
Total	692,491	184,426	165,130	90,366	88,413	66,032	33,383	30,434	30,408	29,495	25,826	22,966	22,232	20,319	19,566	181	224,096	1,745,583

South Atlantic

State	4-12-12	3-9-9	5-10-10	2-12-12	4-8-8	3-9-6	4-8-6	5-10-5	4-7-5	4-10-6	6-8-6	6-6-6	8-8-8	4-8-10	3-12-12	Other grades No. 1/	Other grades Tons 2/	Total tons
Virginia	11,934	37,295	156,369	168,618	2	28,322	0	66,035	0	0	11,720	0	6,875	6,785	0	43	173,376	667,331
North Carolina	15,850	266,853	303,947	148,212	11	144,053	0	16,880	0	2,930	51,057	0	30,457	47,403	7	28	188,049	1,215,709
South Carolina	63,036	145,415	27,904	0	20,203	17,331	0	35,934	0	102,558	4,733	0	6,336	2	73,081	32	69,459	565,992
Georgia	601,431	72,011	7,325	13,735	101,278	996	106,290	3,601	0	24	26,512	0	5,008	5	452	99	109,065	1,047,733
Florida	34,285	5,995	5,666	5,913	75,193	0	36,493	6,738	118,792	444	5,539	94,771	40,799	32,199	2,438	957	850,376	1,315,641
Total	726,536	527,569	501,211	336,478	196,687	190,702	142,783	129,188	118,792	105,956	99,561	94,771	89,475	86,394	75,978	994	1,390,325	4,812,406

East North Central

State	3-12-12	5-20-20	4-16-16	12-12-12	10-10-10	0-20-20	5-10-10	3-9-27	0-10-30	3-18-9	6-24-24	6-24-12	6-12-12	10-6-4	8-32-0	Other grades No. 1/	Other grades Tons 2/	Total tons
Ohio	337,889	116,325	51,367	86,889	65,491	32,134	102,643	1,135	1,103	17,904	3,061	10,489	12,532	12,111	843	131	101,112	953,028
Indiana	112,225	170,880	208,661	97,638	88,950	41,584	2,896	17,864	10,253	4,241	9,023	4,085	4,111	2,255	18,571	130	89,954	883,191
Illinois	68,341	54,191	94,201	53,494	80,411	19,867	300	20,908	4,065	652	8,339	2,064	3,707	2,156	5,712	108	95,428	513,836
Michigan	108,110	116,117	93,137	82,541	34,010	12,561	3,629	3,121	3,151	12,831	1,589	13,641	7,238	11,587	594	89	73,953	577,810
Wisconsin	54,133	104,376	43,498	7,183	30,089	33,588	0	16,240	26,822	780	13,838	362	2,298	304	424	76	55,517	389,452
Total	680,698	561,889	490,864	327,745	298,951	139,734	109,468	59,268	45,394	36,408	35,850	30,641	29,886	28,413	26,144	240	415,964	3,317,317

West North Central

State	12-12-12	5-20-20	6-24-12	10-10-10	8-24-8	3-12-12	5-20-10	0-20-20	10-20-0	4-16-16	8-32-0	4-12-4	8-8-8	8-24-12	10-20-10	Other grades No. 1/	Other grades Tons 2/	Total tons
Minnesota	5,902	86,950	67,313	10,015	0	690	5,406	16,873	2,142	15,241	6,617	0	55	16,945	219	103	91,723	326,091
Iowa	20,999	94,370	3,088	33,760	409	9,696	41,498	9,150	10,493	7,438	10,362	35	31	112	3,183	212	62,837	307,461
Missouri	177,609	16,243	0	13,811	35,359	40,971	0	15,812	26	6,116	1	23,725	25,596	0	5,128	57	82,091	442,488
North Dakota	337	570	3,049	55	0	45	0	54	154	103	1,974	0	0	1,407	75	52	22,186	30,009
South Dakota	37	19	389	147	0	0	0	34	2,402	6	2,925	0	0	13	32	40	3,726	9,730
Nebraska	601	521	157	216	359	9	760	534	4,050	0	4,439	18	5	0	1,891	83	11,159	24,719
Kansas	3,289	373	20	891	19,962	571	32	635	12,026	53	1,459	3,092	295	0	5,290	49	31,633	79,621
Total	208,774	199,046	74,016	58,895	56,089	51,982	47,696	43,092	31,293	28,957	27,777	26,870	25,982	18,477	15,818	283	305,355	1,220,119

(Continued)

Table 5.— (Continued)

East South Central

	4-10-7	6-12-12	6-8-8	4-12-12	5-10-15	4-12-8	5-10-5	0-14-14	3-9-6	3-12-12	0-16-8	10-10-10	5-10-10	8-8-8	6-8-6			
Kentucky	0	24,123	20	359	95,776	99,460	2,070	210	13,422	39,452	0	30,802	15,213	1,344	26,107	98	88,636	436,994
Tennessee	591	247,790	1,727	1,216	14,952	6,642	4,332	343	46,956	8,157	78	4,062	12,725	2,039	1,352	88	70,640	423,602
Alabama	314,420	24	71,898	192,405	0	0	660	71,270	0	0	40,473	3,954	1	14,223	29	53	40,186	749,543
Mississippi	5,707	2,379	139,775	14	0	0	81,996	4,646	0	2,018	615	1,050	11,124	10,094	27	42	42,007	301,452
Total	320,718	274,316	213,420	193,994	110,728	106,102	89,058	76,469	60,378	49,627	41,166	39,868	39,063	27,700	27,515	166	241,469	1,911,591

West South Central

	5-10-5	10-20-10	8-8-8	12-12-12	12-24-12	3-12-12	4-12-4	10-20-0	6-8-12	13-13-13	6-24-24	5-20-20	6-8-8	0-20-20	5-10-10			
Arkansas	32,233	21,399	2,414	11,562	719	754	545	124	14,504	4,457	2,922	1,473	16	8,150	1,631	63	37,801	140,704
Louisiana	22,061	3,408	30,317	20,404	1,654	17,699	7,572	0	1,186	4,127	7,884	8,601	10,985	2,593	2,717	51	13,233	154,441
Oklahoma	20,003	17,846	243	479	2,665	273	2,070	5,703	4	269	409	325	39	75	930	63	10,668	62,001
Texas	95,005	69,113	13,175	5,785	16,118	809	5,997	10,044	27	6,747	1,709	2,247	111	233	2,819	124	45,389	275,328
Total	169,302	111,766	46,149	38,230	21,156	19,535	16,184	15,871	15,721	15,600	12,924	12,646	11,151	11,051	8,097	188	107,091	632,474

Mountain

	10-20-0	20-20-0	10-20-5	24-20-0	6-10-4	20-10-0	10-20-10	18-9-0	10-18-5	10-10-10	10-10-0	10-16-8	14-14-14	6-30-0	12-12-12			
Montana	2,037	260	0	0	150	43	1	0	285	0	0	0	50	566	0	19	515	3,907
Idaho	184	873	2	3,134	226	190	8	0	260	3	0	293	291	122	275	50	2,121	7,982
Wyoming	185	136	0	0	40	31	5	0	26	0	0	0	0	0	0	21	845	1,268
Colorado	497	226	0	0	250	185	368	0	889	187	0	1,087	299	59	380	64	6,298	10,725
New Mexico	87	334	26	0	19	3	130	0	0	15	58	0	0	0	19	24	889	1,580
Arizona	2,348	3,996	4,085	9	230	1,786	1,766	1,657	0	1,118	1,347	0	349	0	0	53	5,945	24,636
Utah	531	0	0	813	2,309	0	0	0	123	0	0	4	0	61	31	32	1,052	4,924
Nevada	63	0	0	0	681	45	0	0	0	202	3	0	40	0	0	18	334	1,368
Total	5,932	5,825	4,113	3,956	3,905	2,283	2,278	1,657	1,583	1,525	1,408	1,384	1,029	808	705	152	17,999	56,390

Pacific

	10-10-10	10-10-5	17-7-0	6-10-4	8-8-4	4-4-2	8-10-12	15-8-4	10-16-8	10-20-20	6-20-20	8-12-0	5-3-2	5-10-10	6-9-6			
Washington	931	108	1	3,321	0	0	0	0	132	3,461	1,638	973	4,422	3,052	0	86	18,842	36,881
Oregon	368	2	0	3,380	0	0	3	5	5,230	1,561	3,309	3,831	230	913	0	65	10,679	29,511
California	24,619	23,252	20,791	7,339	12,658	8,049	7,274	6,434	0	0	0	0	0	0	3,752	3/ 5	167,578	281,746
Total	25,918	23,362	20,792	14,040	12,658	8,049	7,277	6,439	5,362	5,022	4,947	4,804	4,652	3,965	3,752	115	197,099	348,138

Territories[b]/

	14-4-10	9-10-5	14-2-8	15-4-7	10-10-8	12-4-10	13-3-12	12-6-10	8-6-10	12-3-16	6-8-10	10-6-20	16-4-5	5-7-20	12-2-10			
Puerto Rico	47,975	41,755	18,997	18,215	11,303	10,012	9,533	9,313	8,522	8,348	7,468	7,365	4,375	4,160	3,855	27	18,872	230,068

Continental United States

	5-10-10	4-12-12	3-12-12	5-20-20	10-10-10	12-12-12	5-10-5	3-9-9	4-16-16	6-12-12	2-12-12	4-10-7	0-20-20	6-8-8	3-9-6			
New England	52,283	0	321	0	45,484	3,960	12,192	0	0	2,051	5	0	18,434	4,472	0	94	224,091	363,293
Mid. Atlantic	692,491	22,966	30,434	593	165,130	13,504	184,426	446	950	33,383	30,408	0	66,032	0	4	183	504,816	1,745,583
So. Atlantic	501,211	726,536	75,978	584	49,262	3,825	129,188	527,569	186	18,530	336,478	41,715	3,590	49,390	190,702	179	2,157,662	4,812,406
E. No. Cent.	109,468	5,386	680,698	561,889	298,951	327,745	12,322	356	490,864	29,886	0	0	139,734	0	0	244	660,018	3,317,317
W. No. Cent.	1,113	416	51,982	199,046	58,895	208,774	7,085	0	28,957	11,408	0	0	43,092	5	0	287	609,346	1,220,119
E. So. Cent.	39,063	193,994	49,627	12,535	39,868	13,184	89,058	567	6,855	274,316	3,881	320,718	21,962	213,420	60,378	166	572,165	1,911,591
W. So. Cent.	8,097	90	19,535	12,646	4,098	38,230	169,302	21	0	1,913	0	0	11,051	11,151	0	192	356,340	632,474
Mountain	15	45	0	5	1,525	705	484	0	0	0	0	0	40	0	0	160	53,571	56,390
Pacific	3,965	0	0	26	25,918	1,183	573	0	0	82	621	0	579	0	0	121	315,191	348,138
Total	1,407,706	949,433	908,575	787,324	689,131	611,110	604,630	528,959	527,812	371,569	371,393	362,433	304,514	278,438	251,084	1,495	5,453,200	14,407,311

1/ Exclusive of mixtures not reported by grade. 2/ Including the tonnage of mixtures not reported by grade. 3/ Total number of mixtures ranges over 500 but only 14 reported by grade.
b/ Total consumption in Hawaii was 65,428 tons of mixtures, comprising 138 grades, which were manufactured to consumer's specifications.

Table 6.—Ratios of primary nutrients of mixtures consumed in largest tonnage in continental United States, years ended June 30, 1956 and 1957

Nutrient ratio[1]	Consumption		Proportion of quantity of all mixtures	
	1956	1957	1956	1957
	Tons	Tons	Percent	Percent
1:4:4	2,531,259	2,287,069	17.4	15.8
1:2:2	2,017,107	2,185,187	13.9	15.2
1:1:1	1,578,374	1,783,217	10.9	12.4
1:3:3	1,230,328	1,490,491	8.5	10.3
1:2:1	891,471	836,800	6.1	5.8
0:1:1	563,484	542,682	3.9	3.8
1:3:2	518,145	403,194	3.6	2.8
1:6:6	400,812	371,395	2.7	2.6
4:10:7	470,518	362,853	3.2	2.5
1:4:2	319,089	326,880	2.2	2.3
Total	10,520,587	10,589,768	72.4	73.5

[1]N:available P_2O_5:K_2O.

decreases occurred. The use of anhydrous ammonia increased nationally by only 8 percent. The national use of aqua ammonia increased 23.1 percent being confined generally to the Mountain and Pacific regions and Hawaii where this product is principally used. The uses of ammonium nitrate-limestone mixtures, calcium cyanamide, calcium nitrate, and sodium nitrate were generally lower in areas where principally used. Although over-all consumption of urea increased, there were many areas showing decreases; while in these same areas the use of other chemical nitrogen products was higher.

In 1956-57 the total consumption of phosphate materials decreased by 62,352 tons (2.5 percent) from that consumed in 1955-56. The principal changes were in the use of colloidal and phosphate rock which was 94,731 tons (10.2 percent) lower, with decreases of 52,786 tons in Illinois and 35,339 tons in Missouri accounting for most of the change. The 22 percent and under grades of superphosphate decreased 47,028 tons (7.7 percent) from the use of 1955-56 with the East South Central, West North Central, and Mountain regions showing the least change. However, the use of grades of superphosphate containing over 22 percent P_2O_5 increased 48,246 tons (14.8 percent). It appeared that more superphosphate was used rather than higher grades being substituted for lower grades.

Most of the potash materials used for direct application showed an increase in 1956-57 when compared with the consumption in the preceding year. The use of potassium-sodium nitrate appears to have decreased from 20,680 tons in 1955-56 to 9,373 tons in 1956-57, but this may be the result of some of this product having been reported as a mixture. The increase (9,561 tons) in use of mixtures corresponding to grades of this product would nearly account for the decreased tonnage. The use of the 58-62 percent grades of potassium chloride, which comprised 80 percent of the total consumption of potash materials, increased from 309,230 tons in 1955-56 to 370,531 tons in 1956-57 being most significant in the East North Central region and especially in the States of Indiana and Illinois.

The use of secondary and trace nutrient materials, except gypsum, sold through fertilizer manufacturers was relatively the same in both years. Use of gypsum, comprising 94 percent of the total tonnage of this class of products, increased from 738,499 tons in 1955-56 to 891,317 tons in 1956-57 adding 152,818 tons to the total increased tonnage (515,041 tons) of all fertilizers shown for 1956-57 season.

The weighted average primary nutrient content of the various classes of materials consumed was shown in table 7. These averages are based on the composition and tonnage of the individual materials comprising the respective classes. In 1956-57, the national averages of materials containing only N, P_2O_5, or K_2O, were 32.62, 17.92 (available P_2O_5), and 55.20 percent, respectively; of multiple-nutrient materials 24.14, and for all materials 28.81 percent. The corresponding averages for these classes in 1955-56 were 32.36 (revised), 16.55, 55.64, 22.71, and 27.44 (revised) percent. The higher national averages for most of the classes in 1956-57 reflect generally the greater use of the higher analysis products. The lower average for K_2O results from the large increase in the tonnage of lime-potash which contains only 6 percent of K_2O.

HELP YOURSELF TO BIGGER PROFITS

PHOSPHATE PRODUCTION
No other process begins to compare with *way-ahead* Sackett SUPER FLO in making normal, fortified and triple super-phosphates of premium quality at *way lower* cost.

MIXED GOODS MANUFACTURE
Your investment in the latest Sackett Methods of producing conventional fertilizers is *guaranteed* to pay handsome returns. We are anxious to prove it.

MODERNIZATION PROGRAMS
Step ahead of competition by entrusting your fertilizer expansion and modernization facility programs to our care. Many of the most forward-thinking fertilizer producers are glad they did.

GRANULAR FERTILIZER
Sackett Equipment leads the field in Granular Production.
The names of the fertilizer companies who have selected Sackett Granulating Processes above all others, read like a "Who's Who in Industry."

NEW PLANTS
Invest your dollars wisely by having Sackett build your new plant. We do the whole job . . . from the inception stage thru building construction and equipment fabrication to operating plant. See us for guaranteed results.

There is nothing that appeals to a man's reason more than plain facts. And, one plain fact is this . . . you can help yourself to bigger profits by resolving ***now*** to replace wasteful obsolete plant equipment with the latest rock-bottom cost methods as exemplified in Sackett Production Processes and Materials Handling Equipment. Why not start the ball rolling by writing or phoning us today?

THE A. J. SACKETT AND SONS COMPANY
SACKETT EQUIPMENT
BALTIMORE • MARYLAND

1727 S. Highland Ave.

Architects and *Manufacturing* Engineers to the Fertilizer Industry Since 1897.

America's Foremost *Creative* Designers & Builders of Commercial Fertilizer and Superphosphate Plants . . . Related Production Equipment

Table 7.—Primary plant nutrients consumed in mixtures and in materials, as a weighted average, by State and region, year ended June 30, 1957[1]

Percent

State and region	Mixtures[2]				Materials					Total in mixtures and materials
					Single nutrient[3]			Multiple nutrient[2]	Total nutrients	
	N	Available P_2O_5	K_2O	Total	N	Available P_2O_5[4]	K_2O			
Maine	7.56	11.76	12.68	32.00	32.64	19.92	48.57	10.82	26.12	31.69
New Hampshire	6.53	13.08	14.07	33.68	29.17	20.43	58.28	11.66	23.44	31.43
Vermont	4.19	15.74	16.86	36.79	34.29	20.57	60.52	14.06	22.10	32.18
Massachusetts	6.82	10.04	10.57	27.43	17.70	19.87	61.19	11.22	17.04	25.32
Rhode Island	5.92	10.54	10.56	27.02	20.38	18.65	58.33	9.02	16.42	25.80
Connecticut	6.29	10.10	10.01	26.40	25.48	21.53	54.61	12.67	18.07	24.30
New England	6.74	11.56	12.22	30.52	25.60	20.56	57.20	11.96	20.07	28.81
New York	6.53	12.22	10.09	28.84	26.53	22.57	51.55	10.49	23.19	28.07
New Jersey	5.46	10.60	10.30	26.36	24.37	21.32	53.68	11.82	21.51	25.95
Pennsylvania	5.36	12.18	11.94	29.48	29.86	20.55	52.14	12.59	22.92	28.82
Delaware	5.13	11.70	12.46	29.29	29.97	22.77	60.97	12.55	29.38	29.29
District of Columbia	5.99	10.06	5.14	21.19	10.89	20.39	60.37	9.61	10.05	17.70
Maryland	4.58	11.23	10.37	26.18	29.14	17.65	44.47	13.31	24.28	26.08
West Virginia	4.51	12.04	10.70	27.25	24.48	21.56	60.86	9.03	22.37	26.65
Middle Atlantic	5.54	11.79	10.90	28.23	27.31	21.33	51.65	11.57	23.04	27.71
Virginia	4.02	11.08	10.94	26.04	23.27	26.17	15.32	16.34	21.75	25.55
North Carolina	4.21	9.54	9.92	23.67	24.36	17.05	38.85	14.90	24.70	23.88
South Carolina	3.98	9.93	9.69	23.60	21.02	15.31	58.57	18.61	23.65	23.61
Georgia	4.83	10.41	10.70	25.94	25.87	16.74	57.69	29.90	26.23	25.99
Florida	5.86	6.90	8.57	21.33	23.53	7.42	51.31	16.15	18.92	21.07
South Atlantic	4.74	9.27	9.84	23.85	23.68	14.05	41.13	17.31	23.62	23.81
Ohio	5.32	14.32	13.55	33.19	33.00	24.13	56.52	19.95	30.76	33.01
Indiana	5.63	16.43	15.72	37.78	36.38	20.42	60.17	42.08	40.79	38.34
Illinois	6.57	15.09	14.39	36.05	32.99	7.79	60.90	26.55	18.07	24.82
Michigan	6.17	15.57	14.80	36.54	39.00	19.69	52.45	13.19	28.88	35.85
Wisconsin	4.17	16.15	19.48	39.80	47.31	22.24	58.99	15.36	38.72	39.69
East North Central	5.61	15.44	15.17	36.22	35.09	9.54	60.19	20.56	23.78	32.84
Minnesota	5.67	21.88	15.20	42.75	53.75	41.86	58.59	45.71	47.98	43.97
Iowa	6.73	18.35	13.27	38.35	45.81	28.16	60.10	41.82	38.01	38.24
Missouri	8.60	14.63	12.58	35.81	39.48	6.54	60.20	21.27	20.49	28.94
North Dakota	11.37	27.59	5.36	44.32	40.50	45.29	60.12	49.25	47.62	46.41
South Dakota	11.24	24.62	1.63	37.49	43.30	43.45	60.37	45.37	44.22	41.56
Nebraska	9.99	22.50	4.26	36.75	55.06	43.82	60.39	54.87	52.93	50.57
Kansas	10.91	24.09	5.45	40.45	39.65	42.12	60.43	41.26	40.98	40.78
West North Central	7.62	18.68	12.56	38.86	46.22	21.35	59.84	44.50	35.76	37.49
Kentucky	4.89	11.85	12.04	28.78	34.83	22.46	53.80	35.85	31.94	29.39
Tennessee	5.42	11.96	11.40	28.78	34.99	30.12	34.92	36.49	34.06	29.95
Alabama	3.72	11.18	9.75	24.65	25.11	12.56	60.15	38.19	23.02	24.20
Mississippi	5.97	9.89	8.53	24.39	37.14	13.19	60.18	32.32	31.16	28.43
East South Central	4.72	11.30	10.44	26.46	32.70	16.02	50.74	36.37	29.17	27.37
Arkansas	6.48	14.27	13.42	34.17	36.34	38.59	60.11	38.92	40.44	37.74
Louisiana	6.73	14.52	10.79	32.04	39.88	16.73	59.21	32.55	37.24	34.46
Oklahoma	8.00	17.36	7.04	32.40	38.59	25.68	58.00	40.50	32.21	32.32
Texas	8.10	16.71	7.84	32.65	47.82	29.22	55.20	38.62	40.97	37.10
West South Central	7.40	15.70	9.72	32.82	41.77	28.14	59.71	38.68	39.50	36.29
Montana	11.08	20.40	1.13	32.61	37.89	43.73	60.06	47.31	42.65	41.75
Idaho	17.58	18.89	2.68	39.15	30.69	41.79	60.89	41.86	36.09	36.41
Wyoming	12.85	18.93	2.52	34.30	50.73	44.47	60.40	61.24	48.89	47.12
Colorado	12.13	19.67	7.38	39.18	40.84	45.31	46.75	51.17	43.95	43.08
New Mexico	11.90	15.82	3.48	31.20	53.09	34.88	49.08	43.99	43.00	42.51
Arizona	13.91	16.96	3.39	34.26	37.25	36.36	53.08	29.87	35.22	38.35
Utah	10.64	14.42	3.80	28.86	32.50	39.13	60.32	35.75	35.58	34.55
Nevada	8.26	10.45	4.82	23.53	24.45	42.37	52.64	33.30	29.33	27.50
Mountain	13.39	17.62	3.94	34.95	37.40	40.86	51.44	36.87	38.35	37.91
Washington	8.36	12.74	8.71	29.81	37.63	34.40	54.98	35.21	37.49	35.82
Oregon	8.59	16.12	8.87	33.58	27.69	22.26	57.98	37.80	29.63	30.21
California	10.92	10.21	5.61	26.54	29.86	26.48	55.20	13.24	23.54	24.16
Pacific	10.29	10.98	6.21	27.48	30.50	26.86	55.57	15.80	25.62	26.00
Continental U. S.	5.61	12.47	11.45	29.54	33.00	17.87	55.03	24.05	28.85	29.32
Hawaii	11.74	8.90	17.01	37.65	24.44	24.07	59.28	56.79	29.83	32.50
Puerto Rico	11.76	5.88	9.51	27.15	22.04	23.90	55.88	21.35	22.20	26.12
Territories	11.76	6.55	11.17	29.48	23.52	24.05	59.24	50.27	27.37	28.66
U. S. Average:										
1956-57	5.74	12.36	11.44	29.54	32.62	17.92	55.20	24.14	28.81	29.30
1955-56	5.39	12.08	11.20	28.67	5/ 32.36	16.55	55.64	22.71	5/ 27.44	28.29
1954-55	5.24	11.86	10.80	27.90	31.00	19.37	54.56	21.64	27.88	27.90

1/ Excluding fertilizers not guaranteed to contain one or more of the primary plant nutrients, N, P_2O_5, or K_2O. 2/ Guaranteed to contain two or more of the primary plant nutrients. 3/ Guaranteed to contain one of the primary plant nutrients. 4/ Including 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application. 5/ Revised.

Table 8.—Materials for direct application consumed, by class and by product, in States and regions, year ended June 30, 1957[1]

Tons

State and region	Chemical nitrogen materials									Natural organics[2]	Phosphate materials[2]				Potash materials		Total primary nutrient materials	Secondary and trace nutrient materials[2]
	Ammonia (anhydrous)	Ammonium nitrate	Ammonium nitrate-limestone mixtures	Ammonium sulfate	Calcium cyanamide	Nitrogen solutions and aqua ammonia[2]	Sodium nitrate	Urea	Other[2]		Phosphate rock[1]	Superphosphates: Grades 22 percent and under	Superphosphates: Grades over 22 percent	Other	Chlorides 50-60 percent grades	Other[2]		
Maine	0	3,484	3	37	223	2	174	391	1	762	45	3,309	0	110	103	72	8,776	30
New Hampshire	0	780	11	8	233	99	64	153	0	754	0	1,926	7	87	122	9	4,253	9
Vermont	0	787	37	20	10	109	45	176	0	129	52	15,700	5	31	271	0	17,372	19
Massachusetts	0	1,373	0	149	347	13	748	175	33	9,497	112	3,774	10	672	644	21	17,568	271
Rhode Island	0	90	0	8	220	0	34	67	9	1,062	18	293	0	45	68	4	1,918	9
Connecticut	0	882	10	51	308	1	427	266	23	12,022	108	5,202	35	604	648	728	21,315	52
New England	0	7,396	61	333	1,341	224	1,492	1,228	66	24,226	335	30,204	57	1,549	1,856	834	71,202	390
New York	559	12,917	636	412	3,231	923	4,031	786	331	14,922	788	11,699	3,983	773	1,112	1,277	78,380	663
New Jersey	513	2,451	300	88	2,039	316	2,445	419	87	6,764	326	3,719	1,059	1,435	687	170	22,818	131
Pennsylvania	585	8,168	70	2,927	1,232	317	1,375	1,053	285	8,878	3,442	28,227	2,864	1,415	1,278	854	62,970	2,845
Delaware	30	1,258	74	10	613	468	102	95	1	517	200	486	125	152	364	5	4,500	185
District of Columbia	0	4	0	2	0	0	6	0	7	736	0	13	0	37	1	0	806	6
Maryland	413	1,939	438	38	1,668	931	1,334	294	10	1,639	1,600	3,621	33	777	585	409	15,729	1,035
West Virginia	0	1,118	89	312	16	0	1,334	110	1	423	52	6,316	134	139	124	3	10,171	42
Middle Atlantic	2,100	27,855	1,607	3,789	8,799	2,955	10,627	2,757	722	33,879	6,408	74,081	8,198	4,728	4,151	2,718	195,374	4,907
Virginia	1,109	6,682	22,725	910	1,189	6,088	18,339	633	151	1,749	755	6,725	56	2,209	2,966	15,478	87,764	16,768
North Carolina	8,446	18,821	109,681	311	3,932	36,269	77,124	999	226	3,160	958	13,986	0	7,288	10,237	10,350	301,788	49,800
South Carolina	2,135	25,337	76,625	193	818	17,572	80,551	153	0	881	556	14,318	158	7,989	18,925	1,888	248,099	3,975
Georgia	8,403	53,091	42,684	1,295	874	8,969	69,380	182	248	1,909	199	11,295	163	8,069	6,328	1,232	214,321	31,388
Florida	1,727	18,327	4,395	2,971	2,949	7,043	35,137	3,458	7,785	13,685	26,202	8,566	234	3,848	2,105	17,341	155,773	5,704
South Atlantic	21,820	122,258	256,110	5,680	9,762	75,941	280,531	5,425	8,410	21,384	28,670	54,890	611	29,403	40,561	46,289	1,007,745	107,635
Ohio	2,865	14,837	15	13,497	533	4,288	848	2,874	87	7,268	4,673	14,598	5,726	3,077	6,074	1,051	82,311	358
Indiana	10,024	40,152	38	13,877	646	22,296	139	6,758	30	2,164	20,463	5,689	13,873	4,059	61,422	1,790	203,420	295
Illinois	14,727	54,176	721	60,399	115	5,725	11	1,460	57	12,600	517,508	37,198	41,613	12,891	95,673	157	855,041	85
Michigan	3,609	9,350	31	4,115	77	5,880	290	2,290	53	13,458	2,718	8,281	1,684	1,849	2,834	1,111	57,640	1,245
Wisconsin	1,317	6,052	0	227	12	2,246	0	391	17	5,458	1,966	2,171	1,808	1,728	8,764	627	36,984	41
East North Central	34,542	124,567	805	92,115	1,383	40,435	1,288	13,773	264	40,948	549,328	68,137	64,704	23,604	174,767	4,736	1,235,396	2,024
Minnesota	12,503	8,820	113	266	0	10,738	0	497	59	3,141	1,485	6,502	29,744	16,645	8,615	586	99,714	342
Iowa	15,009	33,486	0	468	40	10,740	0	1,374	68	1,842	9,908	37,498	22,099	15,585	9,528	69	157,714	3,037
Missouri	15,360	83,939	0	2,180	0	11,201	66	373	39	3,740	200,773	2,995	8,702	7,731	22,054	339	359,492	296
North Dakota	235	1,101	0	85	0	49	0	73	0	69	0	50	17,770	32,279	25	0	51,736	0
South Dakota	654	2,535	0	55	0	44	0	192	12	288	80	517	4,301	6,161	6	0	14,845	0
Nebraska	45,508	35,208	13	2,134	0	20,203	0	3,878	93	247	446	1,886	24,906	10,040	393	16	144,971	42
Kansas	7,655	48,900	0	1,547	1	253	1	988	16	790	1,006	1,506	11,747	36,111	1,479	7	132,107	120
West North Central	96,924	213,989	126	6,835	41	53,228	67	7,375	287	10,117	213,698	50,954	139,269	124,552	42,100	1,017	960,579	1,837
Kentucky	2,196	32,789	17	564	1,573	1,525	1,657	147	0	575	12,951	26,482	1,384	7,933	8,771	6,499	105,063	169
Tennessee	8,930	44,188	251	464	1,219	56	17,601	39	2	1,198	702	9,376	4,499	9,954	11,525	11,272	121,276	235
Alabama	3,497	80,044	32,889	3,641	1,012	263	79,544	164	3	608	2,936	24,189	839	48,670	9,566	26	287,891	1,930
Mississippi	42,827	171,050	6,845	360	5,592	7,268	51,693	822	23	229	1,526	41,212	1,678	87,599	23,431	232	444,987	66
East South Central	57,450	328,071	40,002	5,029	9,396	9,112	150,495	1,172	28	2,610	20,115	101,259	8,400	154,156	53,293	18,029	959,217	2,400
Arkansas	17,862	68,920	110	5,630	5,163	5,804	24,875	6,857	35	36	313	5,598	11,517	2,739	29,109	365	185,533	1
Louisiana	24,895	41,736	353	9,693	1,045	6,427	20,815	935	373	363	3,764	11,160	1,361	5,326	5,342	87	133,975	150
Oklahoma	1,329	5,727	0	1,114	0	188	402	224	0	1,353	2,174	16,320	6,610	10,216	404	27	46,088	34
Texas	61,750	23,415	0	52,267	608	6,883	1,545	5,461	2	6,441	5,458	44,233	28,196	72,057	2,344	251	317,210	2,853
West South Central	105,836	139,798	463	75,704	6,816	19,302	47,637	13,477	410	8,193	11,709	77,311	47,683	90,338	37,299	730	682,806	3,038
Montana	1,963	6,000	0	3,192	0	513	0	149	16	164	0	40	19,425	8,079	50	5	39,596	417
Idaho	3,041	11,114	57	10,593	0	9,874	0	411	199	172	0	2,558	17,743	11,865	218	0	67,845	9,566
Wyoming	1,115	1,418	0	288	0	16	0	342	0	0	0	0	4,478	1,487	31	0	9,175	0
Colorado	3,596	12,175	0	3,091	6	913	0	2,774	246	1,193	0	1,258	14,493	7,087	437	485	47,954	498
New Mexico	5,461	1,611	0	3,262	0	0	0	2,966	1	386	0	7,422	9,883	4,824	129	89	36,034	30
Arizona	16,321	6,816	1,060	29,853	1,044	10,627	534	14,598	9,199	11,843	0	5,414	3,754	31,039	52	962	143,116	10,351
Utah	1,254	5,314	0	5,024	0	398	0	447	416	812	0	3,087	6,603	3,833	52	0	27,240	153
Nevada	35	241	0	907	1	442	42	22	3	130	0		339	810	0	2	2,977	2,760
Mountain	32,786	44,689	1,117	56,210	1,051	22,783	576	21,709	10,080	14,900	0	19,782	76,718	69,024	969	1,543	371,937	23,775
Washington	23,137	22,306	222	11,295	109	41,644	143	1,209	1,208	3,603	444	4,551	6,029	13,301	2,042	1,219	132,462	15,232
Oregon	6,023	26,062	73	43,524	1,181	39,734	3	4,009	3,792	1,318	45	10,623	1,030	32,384	1,714	159	171,674	16,884
California	71,180	48,205	0	152,964	7,099	249,941	174	21,866	20,089	4/ 318,442	1,074	61,332	16,600	99,692	2,149	5,068	1,085,875	760,517
Pacific	100,340	96,573	295	207,783	8,389	331,319	320	27,084	25,089	323,363	1,563	76,506	23,659	145,377	5,905	6,446	1,390,011	792,633
Continental U. S.	451,798	1,105,196	300,586	454,078	46,978	555,299	493,033	94,000	55,356	479,620	831,826	553,124	369,299	642,731	361,001	82,342	6,876,267	940,639
Hawaii	0	0	0	9,920	0	68,108	125	14,315	42	51	4,357	5,229	4,420	2,551	15,051	2,261	126,430	2,578
Puerto Rico	904	0	0	52,185	0	3,903	1	601	0	0	0	1,645	250	531	117	127	60,264	26
Territories	904	0	0	62,105	0	72,011	126	14,916	42	51	4,357	6,874	4,670	3,082	15,168	2,388	186,694	2,604
Total: 1956-57	452,702	1,105,196	300,586	516,183	46,978	627,310	493,159	108,916	55,398	479,671	836,183	559,998	373,969	645,813	376,169	84,730	7,062,961	943,243
1955-56	5/ 419,354	940,666	313,928	414,398	65,818	418,843	542,804	92,373	64,668	472,706	930,914	607,026	325,723	614,652	322,411	82,428	5/ 6,628,712	789,605
1954-55	353,681	1,115,358	358,023	519,968	68,882	340,574	615,842	68,585	59,254	461,100	604,653	685,722	341,940	592,340	318,657	82,427	6,587,006	791,606

1/ Includes 15,292 tons distributed by Government agencies for test demonstration. Excludes lime and the quantities used for manufacture of commercial mixtures. 2/ The principal kinds are shown separately in table , by regions.
3/ Includes colloidal phosphate the quantity of which is shown separately in table , by regions. 4/ Includes an estimated 250,000 tons of dried manures. 5/ Revised: 900 tons was added to Wyoming total.

Table 9.—Consumption of classes of materials, years ended June 30, 1956 and 1957, with comparisons

Class	Consumption		Change in consumption	
	1956	1957		
	Tons	Tons	Tons	Percent
Chemical nitrogen materials	3,272,852	3,706,428	433,576	13.2
Natural organic materials	472,706	479,671	6,965	1.5
Phosphate materials	2,478,315	2,415,963	—62,352	—2.5
Potash materials	404,839	460,899	56,060	13.8
Secondary & Trace nutrient materials	789,605	943,243	153,638	19.5
Total	7,418,317	8,006,204	587,887	7.9

Table 10.—Change in consumption of the principal kinds of chemical nitrogen materials in 1956-57 from quantity consumed in 1955-56

Kind	Change in consumption	
	Tons	Percent
Ammonia, anhydrous	33,348	8.0
Ammonia, aqua	71,484	23.1
Ammonium nitrate	164,530	17.5
Ammonium nitrate-lime mixture	—13,342	— 4.2
Ammonium sulfate	101,785	24.6
Calcium cyanamide	—18,840	—28.6
Calcium nitrate	— 5,052	— 9.1
Nitrogen solutions	136,983	125.8
Sodium nitrate	—49,645	— 9.1
Urea	16,543	17.9
Other	— 4,218	—46.4
Total	433,576	13.2

PRIMARY PLANT NUTRIENTS

Fertilizers (mixtures and direct application materials) consumed in 1956-57 contained a total of 6,377,541 tons of N, available P_2O_5, and K_2O (table 11). Consumption of primary nutrients was 322,061 tons (5.3 percent) more than that (6,055,480 tons, revised) of 1955-56. In 1956-57 the primary nutrient content of fertilizers comprised 2,135,287 tons of N, 2,303,991 tons of available P_2O_5, 2,668,941 tons of total P_2O_5, and 1,938,263 tons of K_2O. Compared with the preceding year, consumption of these nutrients increased by 201,945 tons (10.4 percent) of N, 56,571 tons (2.5 percent) of available P_2O_5, 25,523 tons (1.0 percent) of total P_2O_5, and 63,545 tons (3.4 percent) of K_2O. The national weighted average of the total nutrient content of fertilizers containing these nutrients in 1956-57 was 29.30 percent as compared with 28.29 percent for the preceding year. Although the consumption of fertilizers containing these nutrients in 1956-57 was only 1.7 percent more than in 1955-56, the total quantity of primary nutrients was 5.3 percent more.

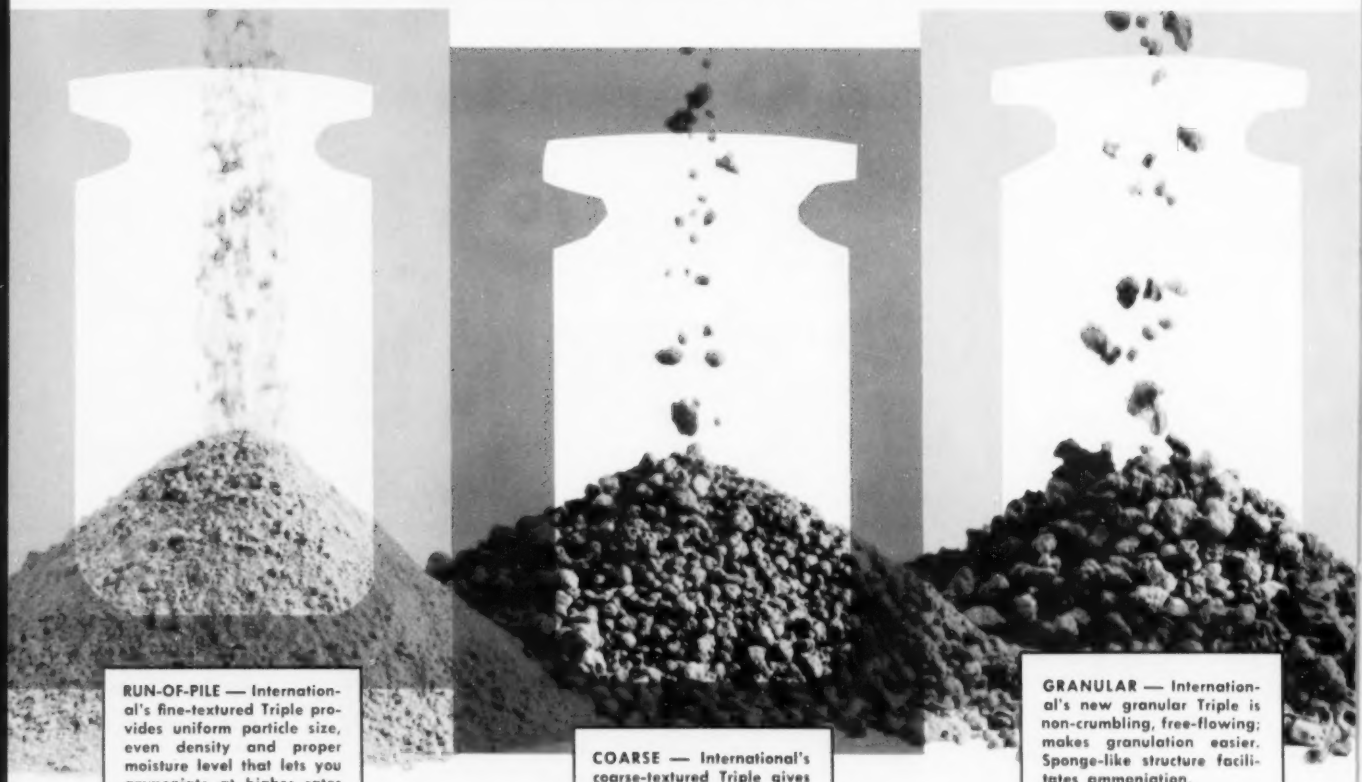
Mixtures comprised 67.6 percent of the total tonnage of primary nutrient fertilizers and supplied 39.5 percent of the N, 78.8 percent of the available P_2O_5, 72.1 percent of the total P_2O_5, and 86.8 percent of the K_2O. In the mixture used these nutrients were 5.9, 1.8, 1.4, and 1.7 percent higher than in the preceding year. While the tonnage of mixtures in 1956-57 was 0.5 percent lower than that in 1955-56, the total quantity of primary nutrients contained therein was 2.5 percent higher. It has been shown in table 7 that the national weighted average of the total nutrient content of mixtures in 1956-57 was 29.54 percent as compared with 28.67 percent for the preceding year. Total nutrients supplied by mixtures were proportionally higher from the lower tonnage of mixtures.

The tonnage of materials containing primary nutrients for direct application comprised 32.4 percent of the total tonnage of this class of fertilizer and supplied 60.5 percent of the N, 21.2 percent of the available P_2O_5, 27.9 percent of the total P_2O_5, and 13.2 percent of the K_2O. The quantities of N, available P_2O_5, and K_2O supplied by direct application materials were, respectively, 13.6, 5.4, and 16.4 percent higher (table 12) than in the preceding year, while that of total P_2O_5 was 0.3 percent lower. Although the tonnage of materials increased 6.6 percent over that in 1955-56, the total quantity of primary nutrients supplied thereby increased 11.9 percent. This is reflected in the national average of the total nutrient content of materials which was 28.81 percent in 1956-57 as compared with 27.44 percent (revised) for the preceding year. In 1956-57 the decrease in the tonnage of colloidal and phosphate rock was largely responsible for the decrease in the tonnage of total P_2O_5 supplied by materials. For the other classes of materials those supplying the major portion of the nutrients of their class were generally higher in 1956-57 than in the preceding year.

Though the national total of pri-

Here are 4 mighty important reasons why <u>You</u> <u>Get</u> <u>More</u> with an International "Stay on Stream" contract

International's Superphosphates

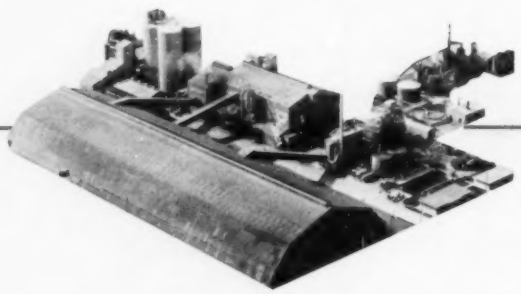


RUN-OF-PILE — International's fine-textured Triple provides uniform particle size, even density and proper moisture level that lets you ammoniate at higher rates and temperatures.

COARSE — International's coarse-textured Triple gives same excellent ammoniation batch after batch . . . promotes desirable agglomeration.

GRANULAR — International's new granular Triple is non-crumbling, free-flowing; makes granulation easier. Sponge-like structure facilitates ammoniation.

FACILITIES AND RESOURCES ARE GEARED TO YOUR CHANGING NEEDS



Improved plant and research facilities! Huge basic material supplies! Highly skilled personnel! All this, backed by a half century of experience in the phosphate and related fields, adds up to a hard-working product-service combination that helps you sell more product profitably.

RESEARCH AND TECHNICAL SERVICE REACH DEEP INTO PRODUCT AND PRODUCTION

Round-the-clock research at International Minerals' laboratories paves the way to new and improved phosphate products . . . uncovers broader uses for your formulated fertilizers . . . generates new sales opportunities every crop year. Technically trained personnel bring the benefits of this research and their own practical experience right into your plant when you need it.

3 Triple

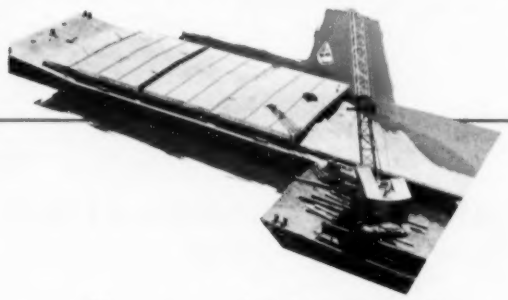
SOLVE EVEN TOUGHEST FORMULATING PROBLEMS

Whether your plant operation demands a fine, coarse or granular texture, International's Triple Superphosphate delivers the form you need.

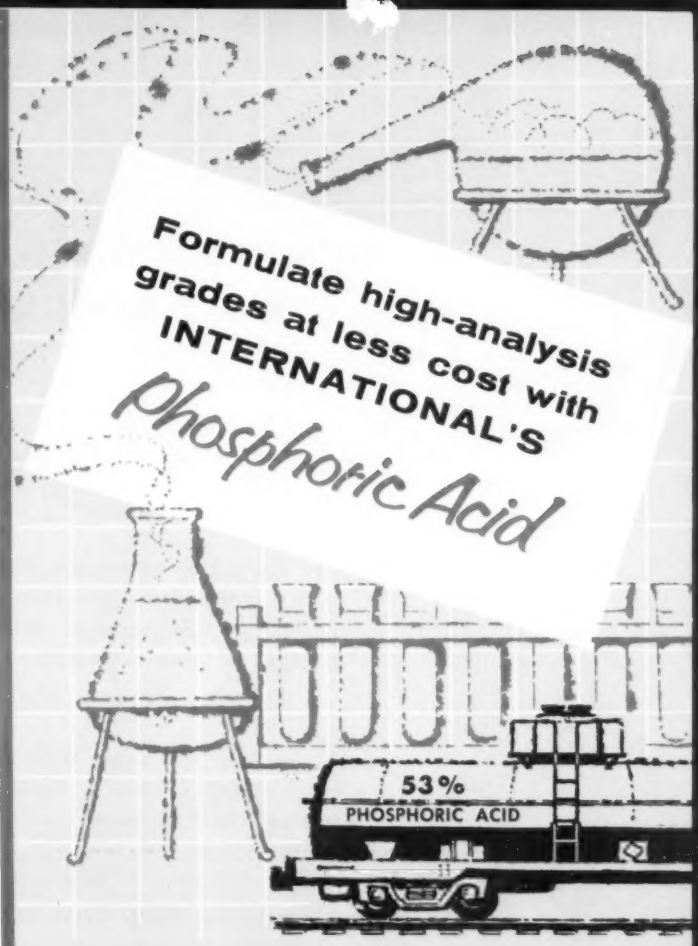
And International offers far more than correct texture. Other bonus values are "built into" each shipment.

- Guaranteed minimum 46% APA — consistent high analysis that reduces unit-delivered cost.
- Extra-long chemical reaction time, unmatched heat control, natural curing promote superior physical and chemical characteristics that make handling and storage easy.
- Uniform high analysis aids in formulation — desirable physical and chemical properties help you hold down reversion problems.

INTERNATIONAL PIONEERS NEW STANDARDS OF SERVICE IN TRIPLE SUPER TRANSPORTATION



When you order International's Triple, you are assured prompt delivery by the nation's most flexible rail, barge or ocean-going vessel system. "On-site" warehousing meets peak load order requirements promptly . . . brings hard cash savings to you.



First from International—a high-analysis triple superphosphate . . . now, *53%-55% phosphoric acid!* It means one dependable source of supply for all your high-analysis phosphate ingredients.

International's wet-process phosphoric acid is specifically "designed" to help you cut formulation costs.

- Specifications — 53-55% P_2O_5; suspended solids, 1.0% by weight, maximum; specific gravity (60° F), 1.70-1.75.

International's huge Bonnie plant is geared to provide an ever-increasing supply of acid for your use. What's more, International's dependable fleet of rubber-lined tank cars put rush supplies of acid plant-side with the service that makes peak season schedules really hum.

Whether you've already modified your plant to use acid, or have changes in the planning stage, International's research and technical service representatives will help you smooth out production problems . . . help you figure ways to cut corners on your formulation costs . . . all to help you keep grade analysis consistently high.

International's Combination of Product and Service Satisfies Customers!

*Here's what they say:**

"We learned by experience. Our ammoniation rate proved that International's Triple had the superior ammoniation qualities we were looking for."

"International's water-route pioneering has trimmed our costs . . . saves us money in every plant where we use triple super.

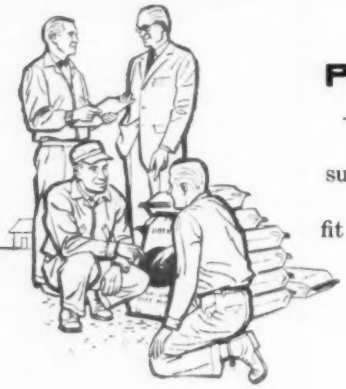
"Granulation results prove International's Triple Super belongs in our plant. We can bank on its arriving in good physical condition for easy handling. We like the way the Triple ammoniates . . . and the uniform pellets that roll off the belts are proof of top granulation."

"We like the way International emphasizes research, develops new products, pioneers new approaches to shipping and technical service."

"International's Triple hits a consistent high in product quality and service. Actual performance is the reason we place it right at the top when we figure our requirements."

"It all boils down to this — we like International's Triple and the way they do business."

**Names provided upon request.*



Profit from their experience

— put International Minerals to the test. You can rely on their superior-quality triple superphosphate, unmatched production facilities and resources, and service tailored to fit your needs. Have your International representative figure your P_2O_5 requirements. Write or wire for full details.

MINERALS International CHEMICALS

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

PHOSPHATE CHEMICALS DIVISION, 20 N. WACKER DR., CHICAGO 6, ILL.

Table 11.—Primary plant nutrients consumed in mixtures and in mixtures and materials combined, by State and region, year ended June 30, 1957

Tons

State and region	Consumption of nutrients in mixtures					Consumption of nutrients in mixtures and materials				
	N	P_2O_5		K_2O	Total N, avail. P_2O_5, and K_2O	N	P_2O_5		K_2O	Total N, avail. P_2O_5, and K_2O
		Available	Total				Available[1/]	Total[2/]		
Maine	12,342	19,197	19,955	20,702	52,241	13,817	19,911	20,697	20,805	54,533
New Hampshire	988	1,979	2,044	2,128	5,095	1,467	2,414	2,486	2,211	6,092
Vermont	1,593	5,983	6,163	6,411	13,987	2,014	9,236	9,518	6,577	17,827
Massachusetts	4,698	6,918	7,210	7,281	18,897	6,021	8,088	8,526	7,782	21,891
Rhode Island	885	1,576	1,659	1,579	4,040	1,054	1,666	1,768	1,635	4,355
Connecticut	3,963	6,365	6,679	6,304	16,632	5,295	8,049	8,492	7,140	20,484
New England	24,469	42,018	43,710	44,405	110,892	29,668	49,364	51,487	46,150	125,182
New York	32,568	60,991	64,856	50,370	143,929	40,614	69,780	74,203	51,709	162,103
New Jersey	13,409	26,025	26,813	25,304	64,738	16,237	27,579	28,496	25,831	69,647
Pennsylvania	30,485	69,239	71,891	67,864	167,588	35,949	77,007	80,911	69,062	182,018
Delaware	4,251	9,696	10,110	10,327	24,274	5,109	9,931	10,408	10,556	25,596
District of Columbia	106	178	190	91	375	146	213	228	97	456
Maryland	12,640	30,967	32,708	28,577	72,184	14,858	32,109	34,358	29,036	76,003
West Virginia	3,258	8,687	9,228	7,723	19,668	4,005	10,129	10,743	7,809	21,943
Middle Atlantic	96,717	205,783	215,796	190,256	492,756	116,918	226,748	239,347	194,100	537,766
Virginia	26,841	73,945	78,937	73,039	173,825	40,451	76,586	81,867	75,880	192,917
North Carolina	51,211	116,038	125,063	120,558	287,807	113,835	119,987	129,417	128,540	362,362
South Carolina	22,542	56,181	60,239	54,859	133,582	65,382	59,795	64,245	67,061	192,238
Georgia	50,637	109,114	115,643	112,104	271,855	98,856	112,813	119,597	116,408	328,077
Florida	77,047	90,752	110,386	112,755	280,554	99,434	94,163	121,498	116,434	310,031
South Atlantic	228,278	446,030	490,268	473,315	1,147,623	417,958	463,344	516,624	504,323	1,385,625
Ohio	50,748	136,517	143,278	129,168	316,433	64,553	143,953	152,357	133,249	341,755
Indiana	49,735	145,118	150,055	138,814	333,667	84,482	155,290	166,363	176,874	416,646
Illinois	33,759	77,539	80,937	73,943	185,241	80,290	126,996	281,825	132,437	339,723
Michigan	35,696	89,972	93,436	85,531	211,159	46,484	93,599	98,031	87,723	227,806
Wisconsin	16,226	62,883	65,007	75,846	154,955	22,448	65,401	68,708	81,425	169,274
East North Central	186,124	512,029	532,713	503,302	1,201,455	298,257	585,239	767,284	611,708	1,495,204
Minnesota	18,481	71,336	73,138	49,556	139,373	38,266	93,972	96,576	54,980	187,218
Iowa	20,695	56,433	58,865	40,808	117,936	50,484	80,809	86,716	46,593	177,886
Missouri	38,080	64,717	67,577	55,678	158,475	83,199	79,734	140,876	69,196	232,129
North Dakota	3,413	8,280	8,517	1,610	13,303	8,458	27,857	28,338	1,626	37,941
South Dakota	1,094	2,396	2,550	159	3,649	3,515	6,534	6,824	165	10,214
Nebraska	2,469	5,562	5,633	1,053	9,084	63,016	21,500	22,050	1,303	85,819
Kansas	8,687	19,179	19,378	4,343	32,209	37,734	43,360	44,654	5,249	86,343
West North Central	92,919	227,903	235,658	153,207	474,029	284,672	353,766	426,034	179,112	817,550
Kentucky	21,374	51,777	56,080	52,612	125,763	35,592	62,888	71,242	60,835	159,315
Tennessee	22,955	50,655	54,500	48,270	121,880	48,655	58,299	62,630	56,239	163,193
Alabama	27,880	83,815	89,564	73,058	184,753	78,505	93,696	101,046	78,835	251,036
Mississippi	18,004	29,826	32,038	25,699	73,529	124,680	47,569	52,238	39,943	212,192
East South Central	90,213	216,073	232,182	199,639	505,925	287,432	262,452	287,156	235,852	785,736
Arkansas	9,120	20,073	21,100	18,886	48,079	58,518	27,635	28,965	36,965	123,118
Louisiana	10,397	22,433	23,582	16,666	49,496	53,153	26,169	28,429	20,064	99,386
Oklahoma	4,957	10,767	11,229	4,363	20,087	9,968	20,338	21,681	4,624	34,930
Texas	22,305	46,007	47,950	21,573	89,885	109,398	87,719	92,190	22,740	219,857
West South Central	46,779	99,280	103,861	61,488	207,547	231,037	161,861	171,265	84,393	477,291
Montana	433	797	831	44	1,274	5,909	12,176	12,562	78	18,163
Idaho	1,403	1,508	1,719	214	3,125	14,392	12,872	13,231	348	27,612
Wyoming	163	240	255	32	435	2,007	2,863	2,933	51	4,921
Colorado	1,301	2,110	2,231	791	4,202	11,533	12,509	12,773	1,237	25,279
New Mexico	188	250	266	55	493	8,057	7,768	8,007	164	15,989
Arizona	3,428	4,179	4,354	834	8,441	41,794	15,520	15,880	1,539	58,853
Utah	525	710	762	187	1,422	5,194	5,696	5,943	224	11,114
Nevada	113	143	153	66	322	672	455	476	68	1,195
Mountain	7,554	9,937	10,571	2,223	19,714	89,558	69,859	71,805	3,709	163,126
Washington	3,082	4,698	4,910	3,212	10,992	43,941	11,696	12,139	5,020	60,657
Oregon	2,534	4,758	4,932	2,617	9,909	42,203	14,856	15,312	3,725	60,784
California	30,210	28,757	29,519	15,797	74,764	223,268	80,356	82,743	26,790	330,414
Pacific	35,826	38,213	39,361	21,626	95,665	309,412	106,908	110,194	35,535	451,855
Continental U. S.	808,879	1,797,266	1,904,120	1,649,461	4,255,606	2,064,912	2,279,541	2,641,196	1,894,882	6,239,335
Hawaii	7,685	5,820	6,021	11,131	24,636	30,597	10,365	11,922	21,394	62,356
Puerto Rico	27,062	13,539	15,272	21,869	62,470	39,778	14,085	15,823	21,987	75,850
Territories	34,747	19,359	21,293	33,000	87,106	70,375	24,450	27,745	43,381	138,206
Total: 1956-57	843,626	1,816,625	1,925,413	1,682,461	4,342,712	3/ 2,135,287	4/ 2,303,991	5/ 2,668,941	1,938,263	6/ 6,377,541
1955-56	796,673	1,785,073	1,897,790	1,654,952	4,236,698	6/ 1,933,342	2,247,420	2,643,418	1,874,718	6,055,480
1954-55	803,541	1,821,087	1,943,822	1,657,864	4,282,492	1,960,536	2,283,660	2,596,719	1,874,943	6,119,139

1/ Including 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application.
2/ Including 22 percent of the colloidal phosphate and 32 percent of the phosphate rock marketed for direct application.
3/ Including 2,630 tons in materials distributed by Government agencies for test demonstrations.
4/ Including 5,418 tons in materials distributed by Government agencies for test demonstrations.
5/ Including 5,470 tons in materials distributed by Government agencies for test demonstrations.
6/ Revised by addition of 739 tons of nitrogen to the Wyoming total.

Table 12.—Primary plant nutrients consumed in direct-application materials in United States and Territories, years ended June 30, 1956 and 1957

Material	Consumption			
	Year ended June 30		Change	
	1956	1957		
	Tons	Tons	Tons	Percent
MATERIALS SUPPLYING NITROGEN	Nitrogen			
Ammonia, anhydrous	1/ 344,317	371,668	27,351	7.9
" , aqua	62,510	76,844	14,334	22.9
Ammonium nitrate	316,964	371,972	55,008	17.4
Ammonium nitrate-limestone mixtures	64,776	62,342	-2,434	-3.8
Ammonium sulfate	86,878	108,140	21,262	24.5
Bonemeal: raw and steamed	388	347	-41	-10.6
Calcium cyanamide	13,515	9,861	-3,654	-27.0
Calcium nitrate	8,630	7,796	-834	-9.7
Natural organics	13,204	13,133	-71	-.5
Nitrogen solutions	34,493	75,241	40,748	118.1
Phosphate products	56,588	62,568	5,980	10.6
Potash products	3,153	1,480	-1,673	-53.1
Sodium nitrate	87,699	79,723	-7,976	-9.1
Urea	41,785	49,527	7,742	18.5
Other chemical nitrogen products	1,769	1,019	-750	-42.4
Total nitrogen	1,136,669	1,291,661	154,992	13.6
MATERIALS SUPPLYING AVAILABLE P_2O_5	Available P_2O_5			
Ammonium phosphate: 11-48	23,265	30,997	7,732	33.2
" " 13-39	16,568	17,850	1,282	7.7
Ammonium phosphate sulfate: 16-20	52,295	53,383	1,088	2.1
Ammonium phosphate nitrate: 27-14	844	1,595	751	89.0
Basic slag	14,115	13,350	-765	-5.4
Bonemeal: raw and steamed	3,244	2,884	-360	-11.1
Calcium metaphosphate	26,786	28,218	1,432	5.3
Diammonium phosphate: 21-53	7,523	10,667	3,144	41.8
Natural organics	9,740	10,799	1,059	10.9
Phosphate rock and colloidal phosphate	27,757	24,919	-2,838	-10.2
Phosphoric acid	7,515	9,400	1,885	25.1
Potash products	73	75	2	2.7
Superphosphate: 22% and under	122,500	112,096	-10,404	-8.5
" over 22%	147,622	169,456	21,834	14.8
Other phosphates	2,500	1,677	-823	-32.9
Total available P_2O_5	462,347	487,366	25,019	5.4
MATERIALS SUPPLYING K_2O	K_2O			
Cotton hull ashes	368	219	-149	-40.5
Lime-potash mixtures	1,418	1,939	521	36.7
Manure salts	246	346	100	40.6
Natural organics	5,758	8,699	2,941	51.1
Potassium chloride	194,754	227,400	32,646	16.8
" magnesium sulfate	1,480	1,704	224	15.1
" sodium nitrate	2,518	1,404	-1,114	44.2
" sulfate	12,926	13,546	1,620	4.8
Tobacco stems	80	235	155	193.8
Wood ashes	129	108	-21	-16.3
Other potash products	89	202	113	127.0
Total K_2O	219,766	255,802	36,036	16.4

1/ Revised by adding 739 tons to Wyoming total.

mary nutrients consumed was higher in 1956-57 than in 1955-56, of the 51 tabulated areas, there were decreases in the use of one or more of these nutrients supplied by either mixtures or materials in 39 (table 13). In 16 areas, however, the increase in the quantity of a nutrient supplied by either a mixture or a material was sufficiently higher to offset the decreased use of the respective nutrient in the other form. The remaining 23 areas are those in which the decrease in the nutrient in one category is not off-set by an increase in the other category. Such areas showing decreases numbered for N, 7; available P_2O_5, 16; total P_2O_5, 19; and K_2O 13. Although thees areas are scattered through all parts of the United States, the greater concentration was in the southeastern part.

The national use of nitrogen increased 201,945 tons. Of this quantity, 154,992 tons (76.7 percent) was supplied by materials and 46,953 tons (23.3 percent) by mixtures. The increased consumption of nitrogen was largest in the West North Central region, followed by the South Atlantic, Pacific, and East North Central regions. While the consumption of nitrogen increased in all other regions, the quantity consumed in the form of materials in the East and West South Central regions increased but that used in mixtures decreased.

The national consumption of K_2O increased 63,545 tons—that used in materials by 36,036 tons, that in mixtures by 27,509 tons. The increased use was largely in the form of materials in the East North Central region (29,858 tons). In the South Atlantic region, the use in mixtures increased 15,083 tons and decreased 1,206 tons in materials. While consumption was generally higher in other areas, the use in both forms in the West South Central region was lower than in 1955-56.

The national use of available P_2O_5 increased 56,571 tons, while that of total P_2O_5 only 25,523 tons. The increased use of available P_2O_5 was largely in the West and East North Central regions. These areas accounted for 41,202 tons (72.8 percent) of the increased use and showed greater use in both mixtures and materials. While consumption of available P_2O_5 was higher in some of the remaining areas, total use in the South Atlantic and West South Central regions was 8,761 tons lower than in 1955-56. The change in consumption of total P_2O_5 was much smaller than that of the available P_2O_5 due largely to the decrease in use of phosphate rock in which the content of P_2O_5 is considered as 3 percent available, and total as 32 percent.

Cyanamid Grants College Leaves

American Cyanamid is granting a year's leave with full pay to a number of its senior research scientists, so they may attend universities, thus keeping themselves and the company up to date on research.

L. D. Hand, (Pelham Phosphate Co., Pelham, Ga.), watches as Jim Propst, of Superior Tank Co., demonstrates model of new Raymond Rotomatic Packer, in Raymond Bag's private rail car at White Sulphur Springs.

Table 13.—Change in consumption of primary nutrients, year ended June 30, 1957, compared with preceding year

Tons

State and region	Mixtures					Materials				
	N	P_2O_5		K_2O	Total (N, avail. P_2O_5, and K_2O)	N	P_2O_5		K_2O	Total (N, avail. P_2O_5, and K_2O)
		Available	Total				Available	Total		
Maine	-1,283	-1,275	-1,636	-1,408	-3,966	891	72	76	61	1,024
New Hampshire	219	425	358	482	1,126	203	-106	-108	12	109
Vermont	323	859	884	923	2,105	168	-321	-341	0	-153
Massachusetts	869	1,160	1,206	1,611	3,640	177	187	237	75	439
Rhode Island	148	228	275	203	579	14	-2	13	10	22
Connecticut	675	1,376	1,417	851	2,902	78	-529	-517	-104	-555
New England	951	2,773	2,504	2,662	6,386	1,531	-699	-640	54	886
New York	1,838	3,158	3,197	1,883	6,879	680	500	444	305	1,485
New Jersey	39	488	462	147	674	310	8	-77	-2	316
Pennsylvania	3	-1,060	-1,126	497	-560	392	23	-306	477	892
Delaware	167	302	342	421	890	-143	31	40	-46	-158
District of Columbia	-19	11	10	-3	-11	-17	-6	-5	3	-20
Maryland	331	1,290	1,177	1,423	3,044	195	132	138	98	425
West Virginia	95	-419	-528	-6	-330	8	86	58	30	124
Middle Atlantic	2,454	3,770	3,534	4,362	10,586	1,425	774	292	865	3,064
Virginia	980	-609	-658	866	1,237	963	300	143	4	1,267
North Carolina	-3,138	-10,821	-11,854	-2,147	-16,106	7,375	-118	-843	9	7,266
South Carolina	609	-5,963	-6,361	-4,239	-9,593	1,728	594	551	-649	1,673
Georgia	8,375	6,142	5,290	8,692	23,209	2,035	-5,105	-5,328	-565	-3,635
Florida	8,254	9,059	10,858	11,911	29,224	4,994	-18	1,064	-5	4,971
South Atlantic	15,080	-2,192	-2,725	15,083	27,971	17,095	-4,347	-4,413	-1,206	11,542
Ohio	3,684	2,124	787	-3,242	2,566	3,197	2,373	2,058	1,786	7,356
Indiana	-126	516	674	-5,418	-5,028	7,250	1,942	3,366	13,753	22,945
Illinois	3,311	1,984	1,958	-3,365	1,930	4,195	5,720	-9,334	11,868	21,783
Michigan	4,059	2,068	2,076	-2,617	3,510	2,841	690	926	1,019	4,550
Wisconsin	1,099	1,533	1,233	3,819	6,451	538	994	740	1,432	2,964
East North Central	12,027	8,225	6,728	-10,823	9,429	18,021	11,719	-2,244	29,858	59,598
Minnesota	3,540	8,843	9,059	3,673	16,056	2,379	4,956	5,204	3,034	10,369
Iowa	467	-535	-662	1,504	1,436	6,100	201	323	251	6,552
Missouri	1,328	-742	-1,276	1,517	2,103	10,475	287	-10,030	1,709	12,471
North Dakota	1,326	1,575	1,490	178	3,079	1,031	1,347	1,105	2	2,380
South Dakota	89	55	60	-13	131	-1,060	28	10	-15	-1,047
Nebraska	381	1,235	1,253	283	1,899	13,563	4,126	4,215	81	17,770
Kansas	821	2,422	2,074	95	3,338	3,225	-2,540	-2,400	-148	537
West North Central	7,952	12,853	11,998	7,237	28,042	35,713	8,405	-1,573	4,914	49,032
Kentucky	1,244	1,086	1,137	2,744	5,074	1,898	-924	-1,722	-436	538
Tennessee	2,402	2,239	2,365	2,786	7,427	529	1,174	862	364	2,067
Alabama	-3,798	-2,829	-3,312	5,132	-1,495	-445	489	428	39	83
Mississippi	-1,050	-2,349	-2,591	-1,503	-4,902	9,233	1,340	1,106	284	10,857
East South Central	-1,202	-1,853	-2,401	9,159	6,104	11,215	2,079	674	251	13,545
Arkansas	-1,729	-2,496	-2,750	-3,736	-7,961	-1,308	-417	-519	-1,696	-3,421
Louisiana	-206	1,124	1,057	-56	862	1,575	-1,863	-2,673	-199	-487
Oklahoma	-718	-1,809	-1,917	-800	-3,327	-78	-2,273	-2,756	-298	-2,649
Texas	239	3,305	3,232	354	3,898	21,448	2,207	1,964	449	24,104
West South Central	-2,414	124	-378	-4,238	-6,528	21,637	-2,346	-3,984	-1,744	17,547
Montana	60	8	0	8	76	2,326	2,864	3,116	-4	5,186
Idaho	647	641	709	71	1,359	2,664	1,629	1,520	54	4,347
Wyoming	-38	-184	-192	-2	-224	359	-367	-361	3	-5
Colorado	-38	-193	-199	54	-177	2,196	1,373	1,383	17	3,586
New Mexico	-80	-81	-82	8	-153	2,074	1,430	1,478	63	3,567
Arizona	991	1,246	1,297	289	2,526	4,806	597	546	-16	5,387
Utah	56	133	118	21	210	-879	662	698	17	-200
Nevada	31	26	28	22	79	237	4	4	0	241
Mountain	1,629	1,596	1,679	471	3,696	13,783	8,192	8,384	134	22,109
Washington	257	-566	-545	-749	-1,058	5,686	-1,350	-1,371	129	4,465
Oregon	248	625	530	58	931	10,824	1,420	1,473	-678	11,566
California	4,292	2,863	2,787	550	7,705	10,598	-416	-720	2,895	13,077
Pacific	4,797	2,922	2,772	-141	7,578	27,108	-346	-618	2,346	29,108
Continental U. S.	41,274	28,218	23,711	23,772	93,264	147,528	23,431	-4,122	35,472	206,431
Hawaii	-67	598	799	115	646	6,308	1,561	1,995	562	8,431
Puerto Rico	5,746	2,736	3,113	3,622	12,104	1,156	27	27	2	1,185
Territories	5,679	3,334	3,912	3,737	12,750	7,464	1,588	2,022	564	9,616
Total	46,953	31,552	27,623	27,509	106,014	154,992	25,019	-2,100	36,036	216,047

CHECK POINTS FOR CHOOSING AN ENGINEERING FIRM—

PICK ONE WITH EXTENSIVE PROCESS INDUSTRY EXPERIENCE

Choose a firm with a staff and facilities geared to the design, engineering and construction of chemical and petrochemical plants —and with a *proven* record in this area of industry.

The Lummus Company, for example, has built over 800 chemical process units in the last 50 years. Among them have been the world's largest butadiene plant, the world's first commercial plant to make high-pressure acetylene chemicals, and one of the least expensive anhydrous ammonia plants ever built.

Lummus maintains a staff of highly trained specialists in seven branch offices and subsidiaries throughout the world. They are thoroughly experienced in chemical plant design and construction.

Then, too, Lummus has an Engineering Development Center to bridge the gap between laboratory research and commercial plant operation. The Center has extensive chemical pilot plant facilities in operation, and is equipped for designing and building new pilot units.

Call in Lummus when you begin plans on your next chemical plant.

CHEMICAL PLANTS— A SPECIALTY OF LUMMUS

ABOVE—America's first full-scale, high-pressure acetylene chemicals plant at Calvert City — engineered and constructed by Lummus for General Aniline & Film Corporation.

BELOW—Just a few examples from Lummus' long list of outstanding chemical projects.

PRODUCT	COMPANY	LOCATION
Vinyl Acetate	Air Reduction Chemical Co.	Calvert City, Kentucky
Phenol-Acetone	Progil-Electro-chimie	Pont de Claix, France
Anhydrous Ammonia	Food Machinery & Chemical Corp. (Westvaco Chlor-Alkali Division)	South Charleston, West Virginia
Phthalic Anhydride	Pittsburgh Coke & Chemical Co.	Neville Island, Pa.
Epon Resins	Shell Chemical Corp.	Houston, Texas
Bisphenol	Shell Chemical Corp.	Houston, Texas
Tetramer, Cumene, Phenol-Acetone	Societe des Chimiques des Derives du Petrole	Antwerp, Belgium
Sulfuric Acid	Inland Chemicals Canada Ltd.	Fort Saskatchewan, Alberta, Canada
Ethylene Oxide-Glycol	Calcasieu Chemical Corp.	Lake Charles, La.
Ethylene	Petroleum Chemicals, Inc.	Lake Charles, La.
Beryllium Metal	The Beryllium Corp.	Ashmore. Pa.

LUMMUS

THE LUMMUS COMPANY, 385 MADISON AVENUE, NEW YORK 17, N.Y.

WASHINGTON, D.C. • CHICAGO • HOUSTON • MONTREAL • CARACAS • MARACAIBO • LONDON • PARIS • THE HAGUE

1. Marshall Roop of Davison Chemical Co.; Fred Litty of Summers Fertilizer Co., and Bill Caspari of Davison Chemical Co., all from Baltimore.

2. W. B. Hicks, Wilson & Toomer Fertilizer Co., Jacksonville, Fla., and Cecil Arledge, Richmond, Va.

NPFI elects

Bennett as president, George as chairman

More than a thousand industry representatives attended the third annual convention of National Plant Food Institute at The Greenbrier in White Sulphur Springs, W. Va., June 15-18.

Fred C. Scribner, Jr., under secretary of the Treasury, was principal speaker, appearing on Tuesday morning's session with his topic "The National Economy, Today and Tomorrow."

Other prominent features on the program included two panels on "Changing Farmers' Attitudes Toward Fertilizer" and "Changing Farmers' Fertilizer Practices" plus a time-lapse motion picture on "Watching Fertilizer Work" by nationally known producer John Ott of Winnetka, Illinois.

The annual business meeting was held Monday morning.

Panel speakers on "Changing Farmers' Attitudes Toward Fertilizer" Monday were: Dr. M. S. Williams, chief agricultural economist of the Institute; Dr. Webster Pendergrass, dean of the College of Agriculture, University of Tennessee; and W. E. McGuirk, president of Davison Chemical Co., division of W. R. Grace & Co., who is chairman of NPFI's Special Study Committee. The panel was followed by a presentation "What National Plant Food Institute is Doing" featuring brief regional reports on the subject by Dr. Richard B. Bahme, Western district representative; Zenas H. Beers, Midwest regional director; Dr. Samuel L. Tisdale, Southeast regional director; Dr. Robert L. Beacher, Southwest regional director; Dr. Willard H. Garman, Northeast regional director; and F. Todd Tremblay, Pacific Northwest district representative. W. R. Allstetter, vice president of the Institute, introduced the panel members.

Panel speakers on "Changing Farmers' Fertilizer Practices" on Monday afternoon were: A. H. Bowers (Swift & Co.), chairman of the Institute's Research and Education Committee, as moderator; Orville Buerge, Buerge Brothers, Harrisonville, Mo.; J. W. Clark, Dane County (Wisc.) Agricultural Agent; and Harry Rash, president of First National Bank, Thayer, Kans.

Mr. Ott's time-lapse film presentation also came on Tuesday, preceded by the showing of another film entitled "The Salesman," a 'Fortune' film production.

Winners in the Institute's Sixth Annual "Soil Builders Award for Editors" contest received awards at the annual banquet on Tuesday evening with Dr. Russell Coleman, NPFI executive vice president making the presentations.

A special ladies' program included Mr. Ott's presentation of a time-lapse film on "Flowery Fantasy."

On the 'Attitudes' panel Dr. Pendergrass said if enough trained workers were available to explain soil testing, assist with sampling procedures, and adapt recommendations to specific field and crop conditions, it would increase use of fertilizer in a practical manner.

KEY TO STAFF PICTURES

1. John Mahan, U.S.D.A., Washington; Dudley George, Richmond Guano Co., Richmond, Va.; and Howard Parker, Sylacauga Fertilizer Co., Sylacauga, Ala.

2. Jack Rutland, Western Carolina Phosphate Co., Waynesville, N. C.; M. S. Wright, Texas Farm Products Co., Nacogdoches, Texas; and Charlie Harding, Va.-Carolina Chem. Corp., Richmond, Va.

3. J. R. Rossman, Hubbard-Hall Chemical Co., Waterbury, Conn., and Bill Schaffnit, Stedman Foundry & Machine Co., Philadelphia.

4. Mrs. John Perryman, Newnan, Ga.; Mr. & Mrs. Dick Goldthwaite, Monsanto Chemical Co., St. Louis; Mrs. Bill Tyler, Sulphur Springs, Texas.

5. Bob Cocks, Farmers Coop. Fertilizer Purchasers, Kenbridge, Va.; and Ray Yates, Ashcraft-Wilkinson Co., Norfolk, Va.

6. John Perryman, R. D. Cole Mfg. Co., Newnan, Ga.

7. T. R. Cox, American Cyanamid Co., New York; R. P. Thomas, International Minerals & Chemical Corp., Chicago.

8. Mr. & Mrs. Larry Byck, Jr., U. S. Industrial Chemicals Co., New York; J. Walter Harding, Federal Chemical Co., Louisville, Ky.; and Gordon Cunningham, Tennessee Corp., Atlanta.

9. Jack Daughtridge, Du Pont, Wilmington, Del.; and Mrs. Bill Porterfield, New York.

10. Mrs. George Moyers; Howard McIver and Alex McIver, Alex M. McIver & Son, Charleston, S. C.; George Moyers, International Minerals & Chem. Corp., Chicago.

11. Dave Batcheller and Gene Van Deren, Blue Grass Plant Foods, Cynthiana, Ky.; Dr. & Mrs. Russell Coleman, NPFI, Washington; Mrs. Gene Van Deren; Mrs. Dave Batcheller, and Warren Huff, Ashcraft-Wilkinson Co., Columbus, Ohio.

12. Sam Nevins, Olin Mathieson Chem. Corp., Little Rock; Lowell Berry and W. L. Garman, Best Fertilizers Co., Lathrop, Calif.

13. Joe Stough, U. S. Potash Co., Columbus, and George Klein, Davison Chemical Co., Baltimore.

14. Dr. K. D. Jacob, U.S.D.A., Beltsville, Md.; and Gordon Cunningham, Tennessee Corp., Atlanta.

15. Andy Farrell, Va.-Carolina Chemical Corp., Richmond, and Tom Bruns, International Minerals and Chemical Corp., Chicago.

16. W. E. Shelbourne, Armour Fert. Wks., Atlanta, and W. E. McGuirk, Jr., Davison Chemical Co., Baltimore.

17. B. E. Adams, Nitrogen Div., Allied Chem. Corp., Hopewell, Va.; and Philip McG Shuey, Shuey & Co., Savannah, Ga.

18. Bill Weems, American Cyanamid Co., Ft. Walton Beach, Fla.; and W. F. Farley, Smith Agric. Chemical Co., Columbus, Ohio.

19. E. F. Crady, North American Fertilizer Co., Louisville, Ky., and Ray White, Spencer Chemical Co., Kansas City.

20. Angus Taylor, Jr., The Chemical & Industrial Corp., Cincinnati; Jim Greene, Ashcraft-Wilkinson Co., Des Moines.

21. Mr. & Mrs. Alan Karp, Morris Karp & Son, Farmingdale, N. Y.


1
2
3
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

RICHARD B. BENNETT

Mr. Bennett is president of Farm Fertilizers, Inc., Omaha, has been a director of NFA and NPFI for years, and has long been an active force in the development of fertilizer markets in the mid-West.

KEY TO STAFF PICTURES

1. Dudley George, Richmond Guano Co., Richmond, Va.; and C. T. Prindeville, Swift & Co., Chicago.

2. Sid Keel, International Minerals & Chemical Corp., John Mooar, Sturtevant Mill Co., Atlanta; and Bill Venable, Cornland Mfg. Co., Grinnell, Iowa.

3. Raymond Hull, I. P. Thomas Div., Dixon Chemical, Paulsboro, N. J., and Ralph Douglass, Smith-Douglass Co., Norfolk.

4. Mr. & Mrs. Ed Smith, Potash Co. of America, Washington; Graham Campbell, Chamberlain & Barclay, Cranbury, N. J.

5. Mr. & Mrs. L. G. Black, Ark-Mo Plant Food Co., Corning, Ark.

6. Morris Newman, Price Chemical Co., Mr. & Mrs. John Collis, Federal Chemical Co., all from Louisville, Ky.

7. Sam Shelby and D. T. Morris, Federal Chemical Co., Louisville, Ky.; Mr. & Mrs. Robert Magness, U. S. Industrial Chemical Co., New York.

8. Mr. & Mrs. Ove F. Jensen, Du Pont Co., Maple City, Mich.

9. Doug Laird Va.-Carolina Chem. Corp., Richmond; Bob Heuerman and Bill Chadwick, International Minerals & Chemical Corp., New York.

10. Frank Keenen, Du Pont, Wilmington, Del., and G. L. Bridger, Davison Chemical Co., Baltimore.

11. Bill Reisack, H. J. Baker & Bro., New York; Fred Coffee, Wilson & Toomer Fert. Co., Jacksonville, Fla.; and T. E. Camp, Jr., Southwest Potash Corp., New York.

12. John Porter, Southern Nitrogen Co., Savannah, Ga.; Mr. & Mrs. Ralph Boynton, U. S. Potash Co., New York.

13. Mr. & Mrs. Quentin Lee, Allen Burson, Jr., and Mr. & Mrs. Elam Nunnally, all from Cotton Producers Assn., Atlanta.

14. Mr. & Mrs. Sam Nevins, Olin Mathieson Chemical Corp., Little Rock.

15. George Walton, Tennessee Corp., Cincinnati; B. W. Bellinger, Tennessee Corp., New York; Tri-State Chemical Co., Henderson, Ky.

16. Mr. & Mrs. W. M. Campbell, Dixie Guano Co., Laurinburg, N. C., and Mr. & Mrs. J. I Owens, Liberty Mfg. Co., Red Springs, N. C.

17. Mr. & Mrs. C. L. Straughan, American Potash & Chemical Corp., Atlanta.

18. Mr. & Mrs. E. D. Kingsbury, Harvey O'Neill and Mark Henderson, Kingsbury & Co., Indianapolis.

19. Mr. & Mrs. T. H. Pitt, Planters Cotton Oil & Fert. Co., Rocky Mount, N. C.; and Mr. & Mrs. T. F. Bridgers, Farmers Cotton Oil Co., Wilson, N. C.

20. Mrs. Fred L. Litty and Mr. & Mrs. Jim Totman, Summers Fert. Co., Baltimore.

21. Mr. & Mrs. Sid Rydell, Coronet Phosphate Co., Norfolk, Va.

ELECTED

OFFICERS:

Richard E. Bennett, president; L. Dudley George, Richmond Guano, board chairman succeeding John Miller and C. T. Prindeville, respectively; re-elected were executive vice-presidents Paul T. Truitt and Russell Coleman; vice-president W. Raoul Allstetter; secretary Louis H. Wilson; treasurer William S. Ritnour.

DIRECTORS:

Victor A. Ericson, Consolidated Rendering and J. F. Crissey, GLF, both to fill unexpired terms. Twelve new members to its board of directors for terms expiring in June 1961: J. H. Epting, Epting Distributing Co., Leesville, S. C.; G. R. Monkhouse, Shell Chemical Corp., San Francisco; Jacob White, Allied Chemical Corp., New York; R. E. Bennett, Farm Fertilizers, Omaha, Neb.; S. L. Nevins, Olin Mathieson Chemical Corp., Little Rock; W. H. Wilson, Virginia-Carolina Chemical Corp., Richmond, Va.; R. C. Wells, National Potash Co., New York; Rene A. Jones, Anaconda Co., Anaconda, Mont.; J. D. Stewart, Jr., Federal Chemical Co., Louisville, Ky.; W. E. Shelburne, Armour Fertilizer Works, Atlanta, Ga.; E. N. Carvel, Valliant Fertilizer Co., Laurel, Del.; Wallace B. Hicks, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.

EXECUTIVE COMMITTEE:

John L. Christian, Monsanto; Ralph B. Douglass, Smith-Douglass; Dean R. Gidney, US Potash; Howard A. Parker, Sylacauga Fertilizer; Stanley S. Learned, Phillips Petroleum; W. E. Shelburne, Armour Fertilizer; with Messrs. George and Bennett.

Based on findings of the recent NPFI study, he outlined recommendations "for our colleges and universities to improve their effectiveness in obtaining greater and wiser use of fertilizers," as follows: **1.** Prepare information in simple, clear, concise terms tailored to fit local situations; **2.** Use all available means of mass communications; **3.** Expand group efforts; **4.** Provide individual counselling; **5.** Work with industry on fertilizer demonstrations; and **6.** Adapt soil fertility information and activities for youth programs.

"The level of knowledge of farmers interviewed indicates the need for some very elementary education in fertilizers," Dr. Pendergrass warned. "Such things as fertilizer grades and ratios may appear to be too simple to explain to farmers, but the study indicates a dire lack of such knowledge."

He said that "mass media has a definite place in getting before a large number of people, with a minimum of time, and with limited personnel resources, the simpler facts of fertilizer usage and other farm improvement practices."

"Let us realize the possibilities of mass communication, but at the same time not become complacent in the belief that the total educational job is being done through such channels."

Dr. Pendergrass said he was "afraid too little attention has been devoted to the economics of fertilization and increasing the farmers' understanding of fertilizer use in relation to the fertility level of the soil."

"Other areas might be mentioned where the colleges could aid in further promoting the wise use of fertilizer, but it is important to recognize that the colleges cannot do the total job; neither can other public agencies, farm organizations, nor the trade," he continued. "But a properly coordinated movement involving all interested groups, and utilizing all available resources can go far in breaking the knowledge-barrier, lessening the fear-barrier, improving the economic status, and providing a more prosperous agriculture and a healthier economy."

Mr. McGuirk told the audience "we have a solid story of the contribution fertilizer can make," and "we must initiate a powerful unified selling effort to raise understanding of our commodity among farmers."

He said the study indicates that our individual advertising efforts have measurably failed, witness the fact that over 50 per cent of the farmers do not even understand the terms used to describe fertilizer, much less how the use of fertilizer can make money for them.

"I think the time has come for

1. Mr. & Mrs. J. H. Epting, Epting Distributing Co., Leesville, S. C.
2. Mr. & Mrs. Edwin Pate, Dixie Guano Co., Laurinburg, N. C.
3. Bill Schaffnit, Stedman Foundry & Machine Co., Philadelphia; Dallas Culver, Huston Culver Fertilizers, Seaford, Del.
4. J. H. Culpepper, Smith-Douglass, Norfolk; Louis Wilson, NPFI, Washington.
5. John Porter, Southern Nitrogen Co., Savannah, Ga., and T. C. Rogers, Nitrogen Div., Allied Chemical, New York.
6. Dr. & Mrs. Vincent Sauchelli, NPFI, Washington.
7. Mr. & Mrs. W. J. Sackett and son Michael, A. J. Sackett and Sons Co., Baltimore.

changes," he added, "first, we can accept the fact that no one company has the funds to put on an advertising and sales promotion campaign of the magnitude that is needed for our industry.

"The only alternative, therefore, is to devise, through the National Plant Food Institute, an intensive joint education, advertising, and sales promotion program," Mr. McGuirk advised. "The best talent in the country must be contacted to develop our plant food story and then take it to the farmer. After determining the cost, we must contribute on a tonnage basis to carry our message to that uninformed and untapped 50 per cent of the nation's farmers. Look on this not as an increase in advertising expense, but a way to spend your advertising dollars more effectively. Since the degree of interest among our members, and others in the fertilizer industry, will determine the success or failure of this massive communications job, I suggest that we immediately take steps to determine those who are willing to contribute—preferably on a continuing basis. If those representing 75 per cent of the tonnage production show interest, the staff of NPFI should then work out a proposal and budget that could be taken to both members of NPFI and non-members for positive action."

Mr. McGuirk recommended to the convention "that a committee be named to explore the possibility and budget of a promotional program and bring their recommendations before this membership at the earliest possible moment," adding that "then it will be up to us."

Dr. Bahme said that "fertilizer is an important weapon in helping farmers to combat adverse weather in connection with crop production."

"Adverse weather is one of the most difficult environmental factors the farmer must face," he said, and NPFI "is supporting research to show how fertilizer may help the farmer combat adverse weather."

He pointed out that "sound research on range fertilization, where moisture is restricted to natural rainfall in arid areas of the West, already indicates how fertilizer improves water use and greater forage."

Fertilizer may also improve growth of plants at low temperatures when nutrients may become limiting," Dr. Bahme continued.

"Additional research is needed to develop new fertilizer markets," he emphasized. "The Institute is supporting research in forage fertilization and forest tree nutrition. More research is being done to show improved quality as well as quantity of crops with proper fertilization."

Motivation rather than lack of ability keeps many farmers at low crop yielding levels, Mr. Beers stated.

"To help farmers establish sound production programs," he said, "the Institute has launched a 'Crop Production Potentials' program in several Midwestern states. This was developed in cooperation with soils specialists at the agricultural colleges.

"The program," he said, "has a twofold purpose: (1) To help the farmer cut his unit costs of production and boost profits per acre; (2) Give the farmer effective information to convince him he can do a better crop producing job.

"The Institute's Midwest office has prepared and distributed wall charts for Illinois and Wisconsin showing the major soil areas of each state, plus information on the potential yields in each area and the management methods needed to achieve them.

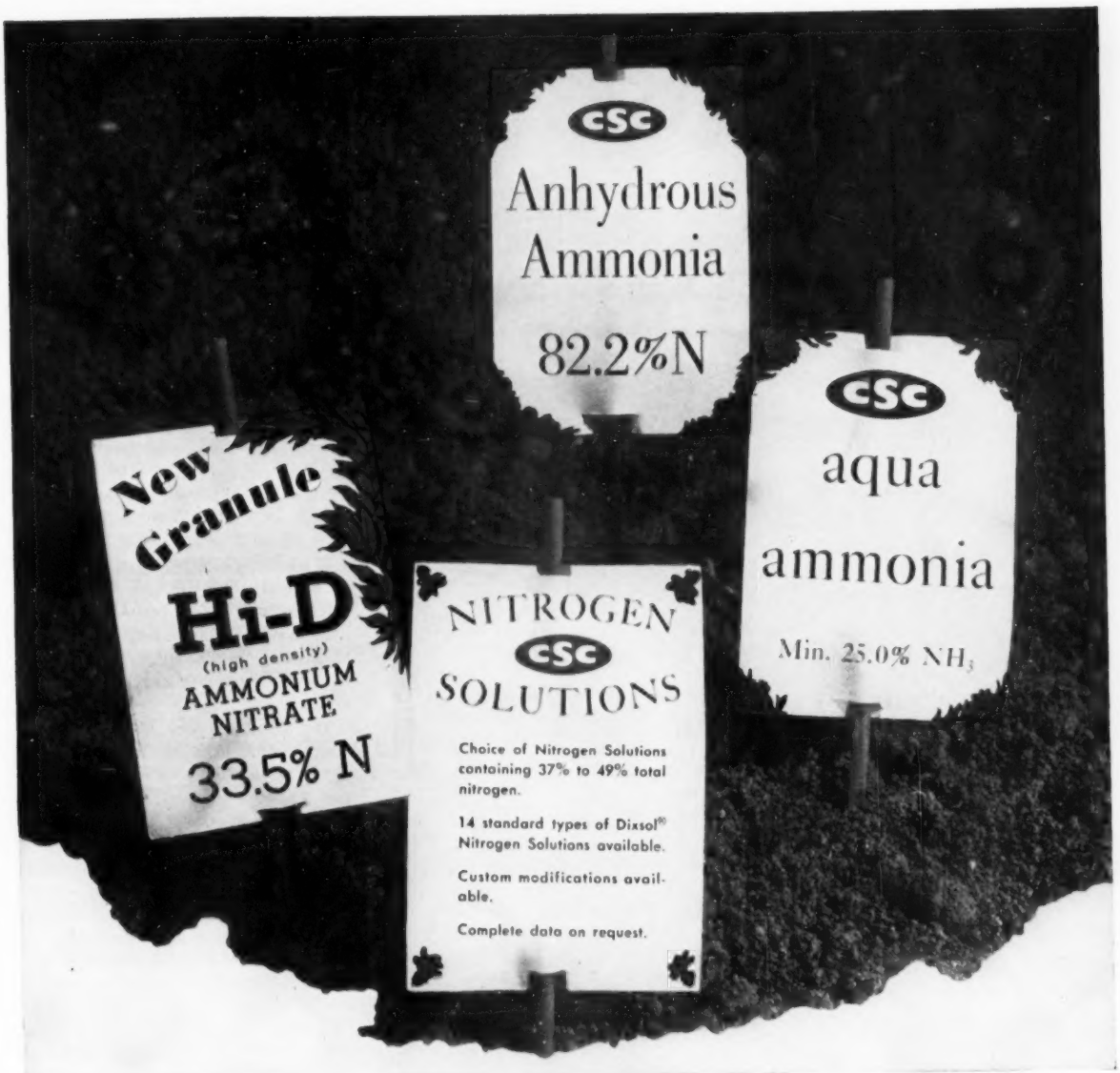
"In addition, the Institute has prepared localized check lists giving farmers specific facts on the soil types in their area, and the crops suited to their soils."

"These crop potentials," he continued, "represent a reasonable goal attainable by nine out of ten farmers in a given area, according to the specialists who have established these yields.

"Progress in the job of informing and motivating farmers to do a better job with the resources they have available," he said, "is a matter of cooperative undertaking between the fertilizer industry, the colleges and others who share in the agricultural community."

Dr. Tisdale said "the fertilizer industry in most Southeastern states could, by effectively encouraging soil tests, double its sales."

"Estimated fertilizer needs in the Southeast are great, and these estimates are realistic," he said. "The tonnages recommended are those known to be needed for a grower to get the greatest net income from his farming operation, and there's a relatively sound but simple expedient which can be used to move these tonnages—it is a sound soil testing program, based on experi-



pick your low-cost nitrogen here . . .

Pick the source that's basic in the key forms of N. Pick CSC. Commercial Solvents Corporation supplies liquid forms for the preparation of high-analysis fertilizers and for the ammoniation of super phosphates. New granule Hi-D, made by a patented process, is a unique, free-flowing, low-moisture form of ammonium nitrate distributed exclusively through fertilizer manufacturers.

Many leading fertilizer manufacturers, with a wide choice of quality supply, select CSC on the basis of thoroughly dependable supply and consistently prompt delivery. Pick up the phone, call one of the numbers listed—and see what service really means at CSC.

Call one of these numbers:

ATLANTA 3, GA.
500 Glenn St., S. W.
PLaza 8-7202

ST. LOUIS 17, MO.
7890 Folk Ave.,
MIssion 5-3330

STERLINGTON, LA.
STerlington 3451

AGRICULTURAL CHEMICALS DEPARTMENT

COMMERCIAL SOLVENTS CORPORATION

260 Madison Avenue, New York 16, N. Y.

NITROGEN the *heart* of the harvest

mental evidence," and NPFI plans to increase its support of this type of activity."

"Because of the importance of credit to the adequate use of fertilizer by farmers, the Institute is working with members of the banking profession in several ways," Dr. Tisdale said.

"The program with bankers is being carried out in about 27 states, several of which are in the Southeastern Region. It is our intention to expand this program as quickly as possible, for it is of great importance to us."

Dr. Beacher told the audience that "farm fertility demonstrations are playing an increasingly important role in getting more farmers to use fertilizer at recommended levels and concerted efforts are being made in the Southwest to get more farmers to see more demonstrations."

"Farm demonstrations are receiving increasing emphasis in fertilizer educational programs of colleges and extension services in Southwestern states," he reported, yet "over two-thirds of the farmers surveyed in the Southwest said they had never visited any such demonstrations. We are working with the land-grant colleges in every way possible to increase the number seeing the tests.

"The Institute is providing new stimuli and opportunities for the colleges by providing demonstration programs, cartoon mats for newspapers, radio and television productions, feature articles for important farm magazines, and sound-color films on demonstrations to give other states the benefit of the effectiveness of the demonstration approach in the field of soil fertility," Dr. Beacher stated.

"The Institute's promotional program in the Southwest not only will include continued emphasis on the use of 'on-the-farm demonstrations' to encourage fertilizer use, but will include the development of better information on the economics of fertilization, particularly in areas of most severe climatic risks," he concluded.

Dr. Garman told the convention "Soil testing provides the most practical tool of today whereby farmers can expect to realize the greatest returns on a dollar invested in fertilizer. However, soil testing is no better than its practical application on the farm, and unless more farmers use soil tests and follow the recommendations, farm income in most states will remain at low levels in comparison with where it should be.

The fertilizer industry has a great deal in common with scientists and information specialists in working toward more economical means of

KEY TO STAFF PICTURES

1. Mr. & Mrs. A. W. Mohr and Malcolm McVickar, California Spray Chemical Corp., Richmond, Calif.
2. Mr. & Mrs. Bill Bellano, and John Zigler, International Minerals & Chem. Corp., Chicago.
3. Mr. & Mrs. George Barley, Diamond R Fertilizer Co., Winter Garden, Fla.
4. Mr. & Mrs. Bill Tyler, Longhorn Engineering Co., Sulphur Springs, Texas.
5. D. H. Banks, Sr., Banks Fertilizer Co., St. Matthews, S. C.
6. W. G. Taylor, Catawba Fertilizer Co., Lancaster, S. C.; T. V. Hough, Kershaw Oil Mill, Kershaw, S. C., and Edwin Sterne, Jr., Chilean Nitrate Sales Corp., Columbia, S. C.
7. P. T. Smith, Smith-Douglass Co., Norfolk, and E. Y. Floyd, Plant Food Institute of N. C. and Va., Raleigh, N. C.
8. C. G. Thompson, Western Carolina Phosphate Co., Waynesville, N. C., and Bill Morris, Owens-Illinois Glass Co., Toledo.
9. John Zigler, International Minerals & Chemical Corp., Chicago; W. G. Taylor, Catawba Fertilizer Co., Lancaster, S. C.
10. H. Vige Miller, Armour Fertilizer Works, and Sam Tisdale, NPFI, both from Atlanta.
11. Doris P. Robison, International Ore & Fert. Corp., New York; H. C. Haase, Gonzalez Chemical Industries, Hato Rey, P. R.

maintaining and improving fertility, he continued. "And, we are fortunate indeed that the various mass media of communications serving agriculture have some of the most outstanding and effective people in the business. Each medium can play a definite role in the educational process, either in interpreting research findings or in the steps involved in carrying through until the new information is adopted as regular farm practice. Utilization of the right medium or media at each stage in the process is essential.

"While there is no panacea for success in farming, there are many sound proctices which as yet are not followed by most farmers . . . we are assisting the established research and educational agencies, and the various communications media, in their efforts to raise agriculture to an efficiency level comparable to that of our other major industries."

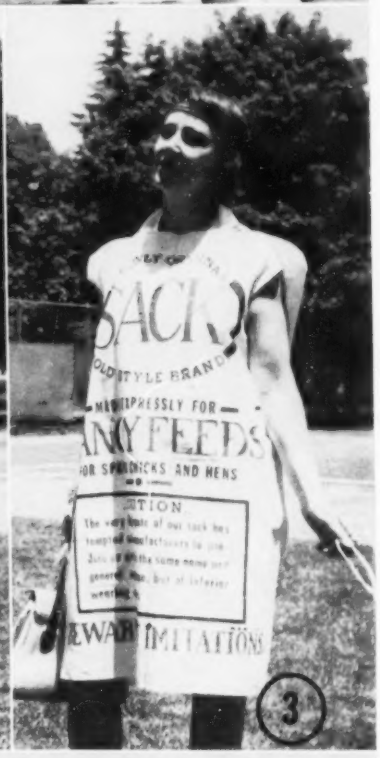
Mr. Tremblay reported that "even during the period of agricultural economic stress, farmers in the Northwest continued to use more plant food," emphasizing that "the obvious reason for this increase is that it is paying dividends to the farmer in the form of more net dollars return per acre."

But he warned, "In addition to making practical use of the knowledge that we have already accumulated, additional research is needed on fertilizer use throughout the area.

All Pictures of NPFI Convention Are by CF's Staff

KEY TO STAFF PICTURES

1. Mr. & Mrs. Erol Beker, Dominion Fertilizers, Port Maitland, Ontario.
2. Dr. & Mrs. J. F. Reed, American Potash Institute, Atlanta; and Mrs. H. B. Mann, Washington.
3. Gus Ashcraft, Duval Sulphur & Potash Co., Houston; Howard Parker, Sylacauga Fertilizer Co., Sylacauga, Ala.; and Eugene German, Duval Sulphur & Potash Co., Houston.
4. Mr. & Mrs. Bruce Cloaninger, Assn. of American Fertilizer Control Officials, Clemson, S. C.
5. Mr. & Mrs. H. E. Wood, Farmers Fertilizer Co., Columbus, Ohio.
6. Dean Keller and Walter Colvin of Nitrogen Div., Allied Chemical Corp.; and Tom Cox, American Cyanamid Co., New York.
7. Mr. & Mrs. Milt Malone, International Minerals & Chemical Corp., Atlanta; Fred Broadway, National Potash Co., Montgomery, Ala.
8. Harold Kruger, Stedman Foundry & Machine Co., Aurora, Ind., and Bev Jones, Sunland Industries, Fresno, Calif.
9. Don Fangmeyer, Northern Chemical Industries, Searsport, Me.; Al Bowers, Swift & Co., Chicago.
10. L. J. Even, W. Va. Pulp & Paper, New Orleans; Mr. & Mrs. Stanley M. Hackett, Dixie Fertilizer Co., Shreveport, La.
11. Nelson Myers, Texas Gulf Sulphur Co., New York; Dallas Culver, Huston Culver Fertilizers, Seaford, Del., and Bill Stark, Atlantic Fertilizer Corp., Riverhead, N. Y.
12. R. M. Jones, Nitrogen Div., Allied Chemical Corp., New York; K. D. Jacob, U.S.D.A., Beltsville, Md.
13. H. B. Mann, American Potash Institute, Washington, and F. H. Stewart, Southwest Potash Corp., New York.
14. Howard Parker, Sr., Howard Parker, Jr. and Jimmy Pursell, Sylacauga Fertilizer Co., Sylacauga, Ala.



What is an example of a crop where research workers have made vast strides in the last few years on proper fertilization, both in the irrigated areas and in the dryland regions. The present knowledge of the inter-relationship between soil moisture, fertility, variety, and climatic conditions has enabled wheat farmers of the area to greatly increase their net return per acre. The yields per acre that are now being attained may be increased even more as we gain knowledge through research on other elements that may be lacking . . . Much more research is needed on rates, ratios, and placement of fertilizer . . . The Institute is not only interested in sponsoring research projects to develop this information, but it is interested in helping to evaluate the results from an economic standpoint, and getting this data out where it can be used by the farmers in the Northwest, Mr. Tremblay stated. "Tree fertilization studies in the Northwest are in their infancy. Preliminary studies however, indicate that fertilizers may be a prime factor in enabling foresters to carry out proper management practices."

The audience for the afternoon panel on 'Changing Practices' heard Orville Buerge, fertilizer service operator, reemphasize the value of soil testing in a marketing plan. He said "we have actively supported the soil testing program . . . have encouraged this program by paying the charges of soil testing, also by furnishing soil sampling bags, and we have even assisted farmers in taking soil samples . . . it is a proven fact that all of this has paid big dividends to all concerned within our territory here in Western Missouri.

"We have instances in our trade territory where bankers have loaned money to purchase fertilizer in accordance with soil test recommendations," he continued. "These same farmers paid off these notes in the Fall of the year. These very same bankers loaned money to farmers to purchase just a small amount of fertilizer which was not in accordance

KEY TO STAFF PICTURES

1. Howard C. Fisher, Diamond Fertilizer Co., Sandusky, Ohio; Sandra and Susan Schlicht, and Mrs. Vincent Schlicht; T. E. Bradley, Potash Co. of America, Peoria, Ill.

2. and 3. Jo (Mrs. Sid) Rydell, Norfolk, and Betsy (Mrs. Frank) Kennedy, Peoria, as they appeared in a two-gal fashion show. Jo wears the latest in hats, Betsy, the latest in "sacks."

4. Mrs. Sid Rydell, Norfolk, Bill Tyler, Longhorn Construction Co., Sulphur Springs, Texas, and Mrs. Ward Cole, Norfolk.

1. Mr. & Mrs. W. R. Morgan, Hydrocarbon Products Co., New York.
2. Mr. & Mrs. John Watt, Armour Fertilizer Works, Atlanta.
3. Mr. & Mrs. I. D. Barclay, Chamberlain & Barclay, Inc., Cranbury, N. J.

with any soil test recommendations; the results were that these last mentioned farmers were not able to pay off the notes, and they requested that the notes be renewed."

Mr. Buerge said that he was "in accord" that the Institute should emphasize fertilizer's "Weather Help," in its promotional activities and that research along this line should be encouraged. He also applauded the Institute's promotion of fertilizer demonstration projects.

He also advocated that farmers use "fertilizer check strips" on their individual farm, pointing out that they "would receive valuable information which could not be obtained in any other way."

J. W. Clark, Dane County agent from Madison, Wisc., told the group that "The weakest link in the chain of information which comes to the farmer about fertilizer usage from college experiment stations through the local county agent is at the decision point—the point where the farmer decides what kind and how much fertilizer to apply to each of his fields.

"Farmers generally respect their state college of agriculture as the best source of reliable and unbiased information on fertilizer usage. The county agent is recognized as the official college spokesman trained to adapt research to local crops and soil conditions.

"Trouble is most farmers never have the opportunity to consult the local county agent when fertilizer decisions are made. A few farmers know the agent well enough to talk with him personally. Others know about him, have listened to him over the radio, heard him talk at a meeting or demonstration or have read some of his circulars or news columns.

"But even if every farmer knew the agent well or was inclined to visit him for private consultation, the agent couldn't take care of him. In my county—Dane, Wisconsin—there are 5,000 farms. These farms probably average 12 fields apiece—60,000 in all. In a single year's time I couldn't possibly advise about all these fields.

"The trick in making education effective is to make it do its job at the decision point. Every county agent knows this and he uses various devices—sometimes effectively and sometimes not—to make his voice heard when decision are made." He does this through local leaders, who are oftener a 'Johnny-on-the-spot' at decision time.

Mr. Clark said that "the educator who believes that the average working farmer is going to make correct decisions about fertilizers, insecticides, weedicides, machinery, bookkeeping, medication, animal husbandry, and farm mechanics is a Pollyana in a daisy patch," adding that "because he can't know everything about everything, today's farmer depends upon other people to help him make a lot of decisions."

Harry E. Rash, bank president from Thayer, Kans., said his bank has "never refused to make a fertilizer loan" and "never had a loss on a fertilizer loan.

"In 1954, we hired the first farm representative in our area," Mr. Rash said. "We felt that with the change in agriculture our farmer-customers needed assistance in planning proper management programs. We regarded a sound fertilizer program as one of the most constructive in which our customers could engage. The use of fertilizer brought the additional net income that was so important to succesful operations.

"The intimate knowledge of our agricultural customers' operations that came to us as a result of our farm representative program work enabled us to do a more intelligent and instructive job of meeting their credit needs than would otherwise have been possible. Our customers

NATIONAL POTASH OFFERS PRECISION SCREENING

From the newest and most modern potash refinery, NATIONAL *brings precision screening to the fertilizer industry.*

Order a car today of our Standard or Coarse muriate for a more uniform and free flowing product, and test this superior potash in your mixed fertilizer.

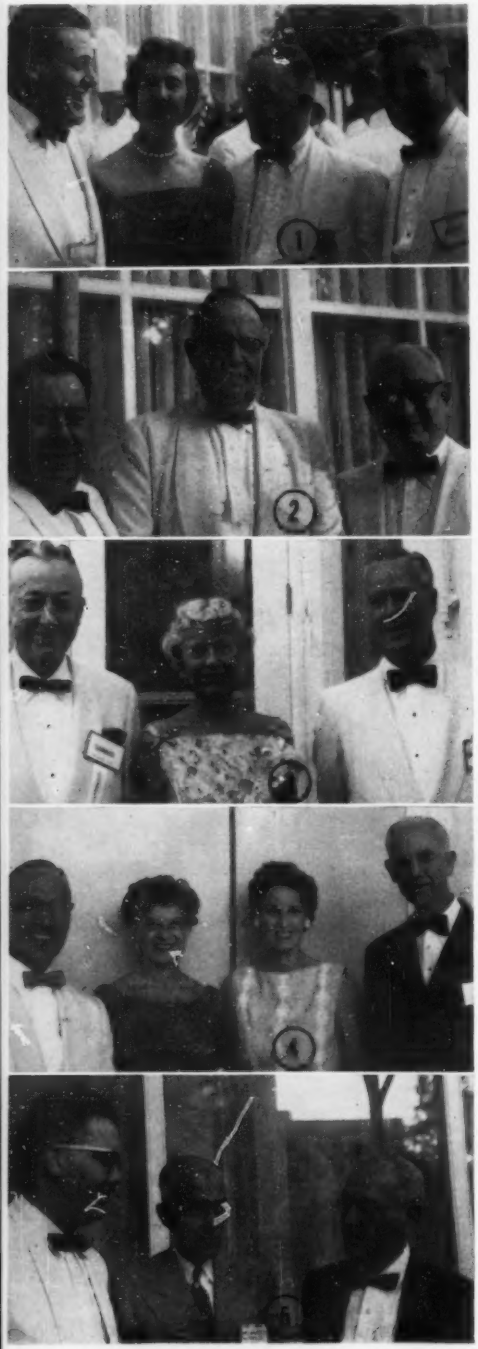
Telephone, wire or write to:

NATIONAL POTASH COMPANY

205 EAST 42nd ST. • NEW YORK 17, N. Y. • ORegon 9-4950

212 Bell Building • MONTGOMERY. ALA. • AMherst 5-8234

1. Frank Smith, W. Va. Pulp & Paper, New York; Mrs. Tom Jones; Chet Lawton, American Potash & Chemical Corp., Columbus, Ohio; Tom L. Jones, W. Va. Pulp & Paper, New York.
2. Louis Even, W. Va. Pulp & Paper, New Orleans; A. A. Schultz, Reading Bone Fertilizer Co., Reading, Pa., and Frank Greeley, W. Va. Pulp & Paper, New Orleans.
3. Mr. & Mrs. Paul Sanders, The Southern Planter, Richmond, Va.; Jack Daughtridge, Du Pont, Wilmington, Del.
4. Mr. & Mrs. Tony Cascino, International Minerals & Chemical Corp., Chicago; Mrs. John Honquest, Chciago; George Moyers, International Minerals & Chemical Corp., Chicago.
5. H. E. Adams, Nitrogen Div., Allied Chemical Corp., Hopewell, Va.; Robert J. Weber, and A. L. Spillman, Fertilizer Mfg. Coop., Inc., Baltimore.



would talk to us about fertilizer loans with the knowledge that we understood their needs and thereby were not afraid to ask for the amount of credit necessary to properly fertilize his crops.

"Our efforts have been directed toward bringing the information that was already available to our customers," Mr. Rash concluded This has helped build our customers, our community, and our bank.

Under Secretary Scribner warned "we must be prepared for an even larger deficit in fiscal 1959 than we experienced this year.

"It now seems fairly clear that our total expenditures for the current fiscal year 1958 will be close to $73 billion," Mr. Scribner said. "While revenue receipts are difficult to forecast at this time with any great accuracy, we expect that they will be in the neighborhood of $70 billion. This means, of course, a deficit of around $3 billion at the end of the fiscal year.

Mr. Scribner said gross national production is down about four percent and personal income down about one percent from all-time record peaks, but pointed out that many measures were adopted to cushion the decline and to promote well-adjusted public confidence.

Mr. Scribner pointed to "favorable signs on the economic front," citing that steel production is now up about 36 percent from a low point in April, while construction is making a very favorable showing with the first five months of calendar 1958 showing an all-time record of total construction expenditures for the period, and engineering construction awards for May up 32 percent over a year ago."

Dr. Paul D. Sanders, editor of 'The Southern Planter,' Richmond, Va., and Berry H. Akers, editor-in-chief, 'The Farmer,' St. Paul, Minn., were presented awards for "superior journalistic contributions toward the building of the soils of our nation" at the banquet Tuesday evening.

These winners in the Institute's nationwide "Soil Builders Award for Editors" contest in a field of 34 magazine entries received the awards from Dr. Russell Coleman.

Scrolls signed by the national judges were awarded Dr. Sanders, representing the winner among magazines of more than 300,000 circulation and to Mr. Akers, representing magazines of less than 300,000 circulation. The award to Mr. Akers was accepted on his behalf by W. H. Kircher, managing editor of 'The Farmer,' who also is president of the American Agricultural Editors' Association.

Farm magazines entered in the contest represented a total readership exceeding 30,000,000.

Arlan Woltemath of Kansas City, who has been named a district representative of the National Plant Food Institute, effective July 1. He will report to NPFI's Midwest regional office in Chicago and will work out of Kansas City. Mr. Woltemath, who has been a district agronomist for Spencer Chemical Co. since 1955, will work in the states of Missouri, Kansas, Nebraska and Iowa, where he will be concerned with NPFI's expanding program of research and education.

NPFI Committees Schedule Meets

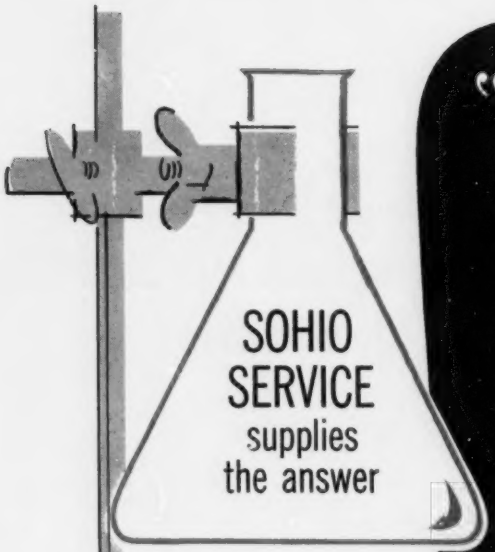
Two NPFI regional committees are meeting this month: the Midwestern Research and Education Committee will get together July 11 with Zenas Beers as chairman, to formulate activities for the coming year. The Midwest Industry Advisory Committee will assemble July 22 to consider plans for the year ending June 30, 1959. New NPFI president Richard Bennett is chairman of this committee, with Zenas Beers as secretary.

NPFI Lists Added Research Grants

In addition to the considerable list of research grants listed in our pages last month, NPFI has reported two additional grants:

Kentucky: The AES has been given $2,000 so that studies may be conducted by Dr. E. C. Doll and A. L. Hatfield to determine the optimum time to apply fertilizers to grass-legume mixtures and to small grains.

Ohio: Ohio State has a grant of $2,000 which is to help support corn fertilization demonstrations by vocational agriculture teachers. The university's agronomists are cooperating in analyzing and correlating the results of the demonstrations, with Don Pfleiderer, a research fellow, supervising the vo-ag work.



"We want a solution with more N... *and a higher Fixed-to-Free ratio!"*

That's the problem one company brought to SOHIO. The answer: Sohiogen Solution 16 for granular fertilizer manufacturers

A PROBLEM with a familiar sound — regular ammoniating solutions just didn't meet the trend to high-nitrogen granular grades. The Sohio men went to work . . . formulated and tested a new solution that met all requirements. In addition, low salting-out temperature made it easy to handle, and recycle rate was low.

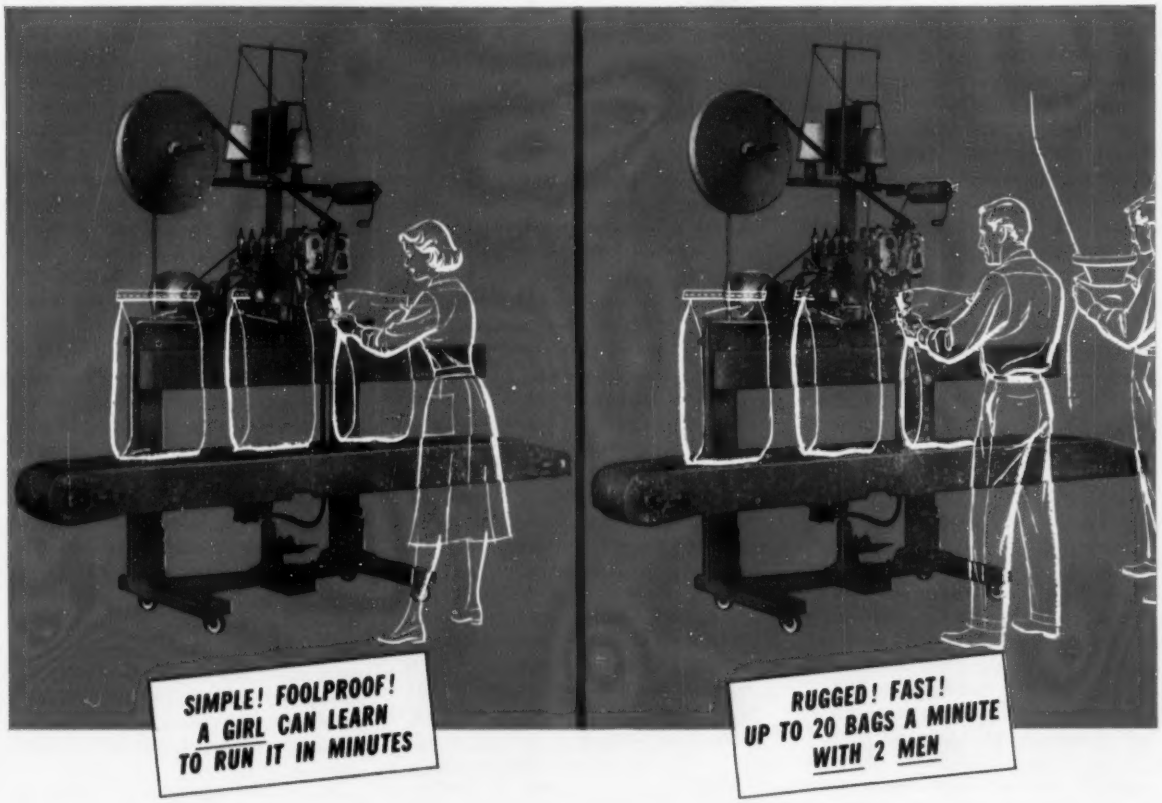
Even more important, as Sohiogen Solution 16, the new solution can help you formulate high-analysis granular grades at lower cost. You'll save by using more of the low-cost nitrogen materials . . . less acid . . . and you'll have more room to use your lower cost phosphates. Sohiogen Solution 16 is just one example of how you can benefit from Sohio SERVICE . . . and a full line of Sohio nitrogen materials. Call the "Man from Sohio" for details.

. . . we're serious about SERVICE at Sohio

SOHIO CHEMICAL COMPANY

FT. AMANDA RD., BOX 628, LIMA, OHIO • PHONE: CA therine 5-8015

Best Buy in Bagclosers!



New Bagcloser Model 171

ONLY

$2650 F.O.B. Buffalo

COMPLETE WITH 9'9" SELF-LEVELING CONVEYOR, INSTALLATION and TRAINING FOR YOUR OPERATORS

Change your ideas about output and costs!
Precision-engineering brings you new Bagcloser 171.
The most efficiency and versatility for your production dollar.

Longest Conveyor. 9'9" Hydraulic "barber shop" height setting! Men stand erect. Plenty of elbow-room between fill spout and sewing head.

Automatic Stitcher Head controlled by bag passage. No inefficient one-leg hop; no tiring stoop or bend.

Fast—Up to 20 bags a minute with two men, 8 a minute with one, *steadily*, because it doesn't tire workers.

Most Economical and versatile machine for chemicals, feed, fertilizers, and consumer units in SOM paper bags. Caster-mounted, it works with all weigh machines and adjusts *to* spout height.

Handles All Bags 14½" to 30" Fast, easy changeover with self-adjusting conveyor.

Explosion-Safe and Trouble-Free—Pneumatic-clutch sewing head. Welded steel construction. Ball and roller bearings. Standard model wired to Nema 4 specs. Furnished to Nema 7 or 9 specs. at 1/3 optional cost of other machines.

INTERNATIONAL PAPER

BAGPAK DIVISION, N.Y.17, N.Y.

INTERNATIONAL PAPER COMPANY
220 East 42nd St., New York 17, N. Y.
Room 1404F

Please send full data on Bagcloser 171.

Name_____

Firm_____

Address_____

PEOPLE in the Industry

Meeken

Walter E. Meeken will retire as vice-president and manager Consolidated Rendering, after 49 years with the firm. He has been on the board for the past two years of NPFI and was on the board of NFA.

Davis

John M. Davis has been named general manager of the Campbell Fertilizer Co., Houston, Texas.

Nevins

S. L. Nevins, vice president, Olin-Mathieson, plant food division, has been elected to the national board of the National Committee on Boys and Girls Club Work. He is one of 12 who manage the Committee which in turn works closely with 4-H Club activities.

Monsanto

Monsanto Chemical's inorganic chemicals division has announced W. R. Bone as salesmanager for St. Louis, and Stewart D. Daniels as St. Louis technical service manager. Leroy Donald has been made chief agronomist for the diivsion and J. R. Glatthaar is now assistant director of agricultural chemical sales.

John C. Doctor has been made an associate product sales manager for direct application liquids for the division, R. W. Goldthwaite has been given the same title in sales to fertilizer manufacturers. B. M. Machen has been made district sales manager of a newly established agricultural chemicals sales office at New York.

Olin Mathieson

Frank J. Pizzitola has been named general manager, chemicals division, Olin Mathieson International Corporation, it was announced by A. T. Zodda, vice president, operations. Mr. Pizzitola joined the company in 1956. George L. Mikan, the former All-American and professional basketball player is joining the Forest Products division of Olin Mathieson Chemical Corpoation, where he will be a member of its container sales staff, it was announced by Robert Adam, general manager of Olin Mathieson's new container plant to be established in Joliet, Ill.

Horsfall

James G. Horsfall, director of The Connecticut Agricultural Experiment Station since 1948, received an honorary Doctor of Science degree from the University of Vermont, Burlington, on June 15, awarded in recognition of outstanding contributions to agriculture, industry, and science in the field of plant pathology.

McCormick

The appointment of John F. McCormick as plant operations manager has been announced by R. W. Sterrett, vice president and general manager of Zonolite Company's expanded product division. Mr. McCormick joined the firm in 1953.

Laputka

Joseph J. Laputka has been appointed treasurer of Escambia Chemical Corporation at the regular meeting of the board of directors R. U. Haslanger, president, announced. Mr. Laputka joined Escambia last year as assistant treasurer.

Lane

C. F. Lane has been named division acid superintendent, Southern division, of the American Agricultural Chemical Company, New York, it has been announced by D. S. Parham, vice president, production.

International Paper

Hans G. Brandes and William G. Clark have been appointed to the staff of the marketing research department, marketing research and new products division, it was announced by Dr. Jack T. Turner, manager of the department.

Bemis

Judson Bemis, executive vice-president of the Bemis Bro. Bag. Co., has announced that C. W. Akin, manager of the company's Omaha bag factory and sales division, succeeded H. C. Davis as director of Group VI Operations effective July 1. Mr. Davis is leaving Bemis to engage in other business activities. Mr. Akin will be succeeded as manager at Omaha by S. M. Spencer, assistant manager of the St. Louis plant and sales division.

Mr. Bemis has also announced the appointment of W. D. Stohlman, manager of the Norfolk bag factory and sales division, as Midwestern representative of the Bemis Cotton department. The position is a newly-created one made necessary by the changing distribution pattern of Bemis cotton mill products. L. H. Goff, Jr., plant superintendent, will succeed Mr. Stohlman as manager at Norfolk.

Sherrill

The Raymond Bag Corporation has announced appointment of Robert L. Sherrill of Memphis, Tennessee, to its general sales staff.

Sherrill

Mr. Sherrill's sales territory will consist of Mississippi, Tennessee, Arkansas and Louisiana. He has had extensive experience in the bag industry, having spent 15 years each with the Bemis Bro. Bag Company and Union Bag and Paper Corporation.

IMC

Two appointments in the purchasing department of International Minerals & Chemcial Corporation named Chester F. Teeple director of purchasing, and S. Arthur Fournier purchasing agent in charge of central buying, effective July 1. Both joined International in 1952.

Meyer

Staff additions and promotions in the agricultural department of Wilson & Geo. Meyer & Co., were announced by Ralph S. Waltz, the firm's agricultural department vice president.

The personnel movements included:

Henry Kinsell, sales representative at Fresno, promoted to assistant manager of agricultural sales, Southwest territory, Los Angeles, succeeding Philip A. Sawyer who was transferred to Salt Lake City, Utah, as assistant sales manager of Wilson & Geo. Meyer & Co. Intermountain, a Meyer affiliate.

Delbert Peterson, sales representative at San Francisco, was transferred to Seattle, Wash. to replace N. A. Carlsen, resigned. Peterson will assist Jack M. McConkey with agricultural sales in Northwest territory.

James Stewart Calkins joined the agricultural sales staf in San Francisco where he will handle product sales in Northern California.

Richard Lewis joined the Fresno office of the firm, to represent them in the San Joaquin Valley, succeeding Henry Kinsell.

Hightower

Bill Hightower has been appointed to the position of technical sales representative by Velsicol Chemical Corporation. He joined the company's agricultural chemical division, and will operate in the Ten-

nessee-Arkansas area, under the direction of L. F. Bewick. His headquarters will be at 1306 Myrtle Street, Greenwood, Mississippi.

Young

Henry J. Coleman, sales manager of the Sohio Chemical Company, Lima, Ohio, announces the appointment of William L. Young to the position of agricultural sales representative for Northern Illinois, Iowa, Wisconsin, and Minnesota. Sohio has been represented in this area by Russell I. Pisle, Jr., who is moving to Ohio to represent the company in the Ohio area.

Casler

E. T. Casler, manager of the Florida department of International Mineral & Chemical Corporation's phosphate minerals division at Bartow, will retire effective August 31, according to an announcement by the division vice president, George W. Moyers.

Floyd B. Bowen assumed direct responsibility July 1 for the management of the Florida department in addition to his other duties as production manager of all operations of the division.

Urbanis

International Minerals & Chemical Corporation has announced the appointment of George J. Urbanis as district sales manager of its phosphate chemicals division in charge of a territory extending into New England, the Mid-Atlantic states, Ohio and Canada.

Roeschen

Appointment of William Roeschen as chief engineer of Highway Equipment Company was announced by A. F. Clauss, vice president and general manager. He was formerly sales engineer for Arrow Manufacturing Company, Denver.

Spargur

Delavan Manufacturing Company of West Des Moines, Iowa, has announced promotion of William B. Spargur to sales manager of the agricultural and industrial sales division. He previously was assistant sales manager for these lines.

Spargur's new responsibilities include complete supervision of sales activities in the United States and foreign markets for Delavan's spray nozzles and accessories.

Hazelton

Richardson Scale Company's western regional office has announced the assignment of Homer H. Hazelton as Pacific Northwest representative.

changes

Olin Mathieson

Olin Mathieson has completed its integration program, consolidating the company's operating units into seven industrial divisions. Edward Block is vice-president and head of the new chemicals division, in charge of industrial, organic, agricultural and phosphate chemicals operations, all formerly independent divisions.

Block

Heading the other three new divisions are vice-presidents Jess E. Williams, metals; Robert H. Evans, packaging; Carroll Copps, energy.

Under the new set-up eleven former divisions have become four, while the Squibb, Winchester-Western and International divisions continue their present organization structure.

Walter F. O'Connell becomes corporate vice-president for finance. Russell Hopkinson has been made corporate vice-president for commercial development.

IMC

International Minerals and Chemical Corp. moved the area headquarters of its plant food division to Tupelo, Miss. from Montgomery Ala., effective July 1.

Sam P. Marshall, Jr., is the area manager.

The company revealed the projected move in an announcement by M. S. Malone, district sales manager for the potash division.

The company's fertilizer plant in Montgomery will be converted to a service warehouse for potash.

West Virginia

West Virginia Pulp and Paper Company's new multiwall bag division organizational set-up has been announced by executive vice-president David L. Luke 3rd. Administrative direction of the new division, which comprises four multiwall plants recently acquired from Fulton Bag and Products and from Arkell and Smiths will be handled from the central offices in New York. Management and sales personnel of the two companies have been consolidated into a single unit within the West Virginia organization.

Field responsibility for the division's activities, including overall direction of the plants at Wellsburg, W. Va., Mobile, Ala., New Orleans, La., and St. Louis, Mo., will be shared by two regional managers. Sheldon Y. Carnes, formerly vice-president of Arkell and Smiths, will be regional manager with headquarters in New York. Jason M. Elsas, formerly president of Fulton Bag and Products Company, will be regional manager with headquarters in New Orleans.

Other executive assignments include Thomas L. Jones of New York and J. Frank Greeley of New Orleans as regional sales managers, and Arnold C. Harmsen and Peter H. Walmsley as regional production managers.

Eight sales districts, with territories covering the multiwall markets east of the Rockies have been established. District sales managers include J. A. Mundie at New York City, covering New York, Pennsylvania and the New England states; R. C. Masoner at Columbus, Ohio, serving Ohio, Indiana, West Virginia and Michigan; R. E. Jury at Chicago, whose territory includes Illinois, Missouri, Iowa, Kansas and Nebraska, and E. B. DuBois at Minneapolis, serving Minnesota, Wisconsin, North Dakota and South Dakota.

Also L. J. Even at New Orleans, serving Louisiana, Mississippi, Alabama, Arkansas, Tennessee and Kentucky; F. L. Smith, to be headquartered in a Southeast Atlantic City not yet selected, covering Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida and the District of Columbia; and S. P. Herd at Dallas, serving Texas, Oklahoma and New Mexico. W. M. Ritchie will be district sales representative at Denver, covering Colorado, Utah and Wyoming.

Mr. Luke said the new multiwall bag division would be able to provide the company's customers with manufacturing, sales and technical services supported by all the resources of the parent company, which has been a major supplier of multiwall kraft paper for the past 30 years. The company recently introduced to the multiwall bag market a revolutionary stretchable paper with unusual strength characteristics, which is being sold under the brand name of Kraftsman CLUPAK paper.

Compost Co.

Purchase of the equipment, a trade name and other assets of the Chicago Stockyards Compost Co. has been announced by George T. Klein, president of Dairy Organic Compost, Inc., Germantown, Wis.

Mr. Klein made the purchase from William Wood Prince, sole owner of Chicago Stockyards Compost and also president of Armour & Co. The price was not disclosed. Chicago Compost's plant was not involved in the transaction.

Mr. Klein said the acquisition would more than double his firm's production of organic soil conditioner. This year, he expects to turn out more than one million bags — ranging from three ounces to 50 pounds—of compost. Last year production totaled more than 400,000 bags.

Dairy Organic's plant in Tampa, Fla., has boosted production threefold since it started operations in 1955. Mr. Klein, a former dairy farmer, started the firm in 1951.

Spencer

Formation of Spencer Chemical International, Inc., as a wholly-owned subsidiary to conduct foreign trade operations is announced by Spencer Chemical Company.

Spencer Chemical International will operate as a separate corporate entity, with a central office in Panama City. It will conduct worldwide sales operations involving all exportable Spencer products not covered by existing sales contracts.

Kenneth A. Spencer, president of Spencer Chemical Company and chairman of the board of the new corporation, announced that the officers of the company would be: G. Maynard Jenkins (formerly head of the parent company's Foreign Department), president; J. E. Culpepper and Albert Slingerland, vice presidents; Richard Cahill, secretary and treasurer and E. F. McGill, assistant secretary.

Overseas Chemical Booklet Offered by Monsanto

Monsanto Chemical Company's line of agricultural chemicals, including fertilizer materials, feed supplements, herbicides and insecticides, is described in detail in a special agricultural chemicals issue of "Monsanto International," an informative, 36-page publication for overseas distribution released last month.

Published in French, Spanish and English editions, the special issue details the properties of each of Monsanto's agricultural chemicals and describes how they are used in formulations.

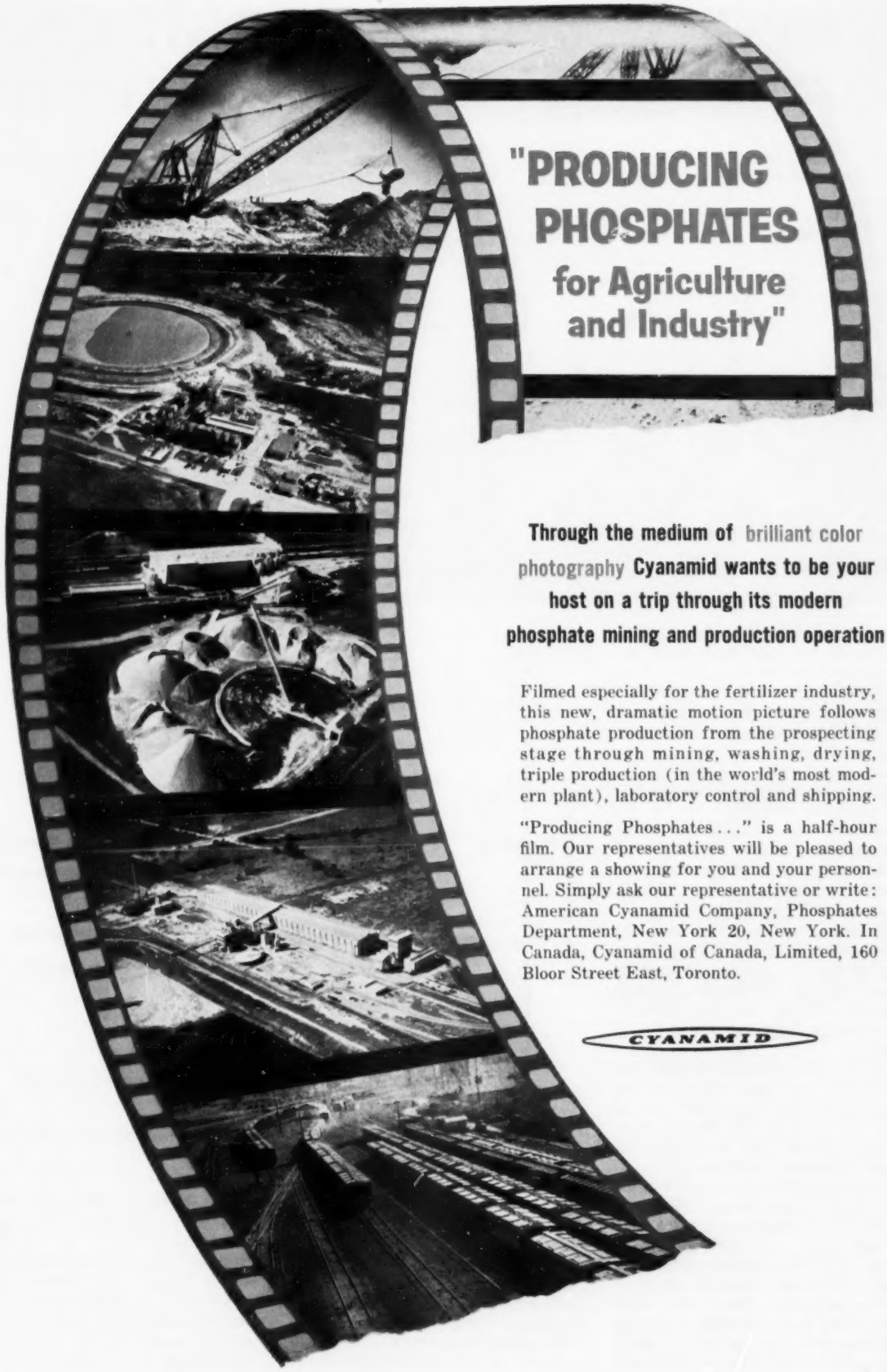
The magazine is divided into four main sections: the first deals with the company's fertilizer materials available to its overseas markets; a section is devoted to insecticides; the third section covers five of the company's weed killers; the final section deals with Monsanto's feed supplements.

Replete with photographs and illustrations, the magazine is available from the Editor, "Monsanto International," Monsanto Chemical Co., Overseas Division, Lindbergh and Olive Street Road, St. Louis 24, Mo., U. S. A.

OBITUARIES

W. E. Scott, New York district salesmanager, International Paper's Bagpack division, a 26-year veteran, died June 10 after a short illness.

Pym Wilson, 74, secretary-treasurer of Dixie Guano Co., Suffolk, Virginia, drowned June 9 in the Nansemond River. He had been in poor health for some time.



Through the medium of brilliant color photography Cyanamid wants to be your host on a trip through its modern phosphate mining and production operation

Filmed especially for the fertilizer industry, this new, dramatic motion picture follows phosphate production from the prospecting stage through mining, washing, drying, triple production (in the world's most modern plant), laboratory control and shipping.

"Producing Phosphates . . ." is a half-hour film. Our representatives will be pleased to arrange a showing for you and your personnel. Simply ask our representative or write: American Cyanamid Company, Phosphates Department, New York 20, New York. In Canada, Cyanamid of Canada, Limited, 160 Bloor Street East, Toronto.

CYANAMID

NPFI COMMITTEE REPORTS ON OFF-SEASON FERTILIZER MARKETS

Last year an NPFI committee on off-season uses for fertilizer was appointed by Dr. Russell Coleman. They met in June of 1957 and set up 3 activities:

1. A graph showing the movement of fertilizer by months in the Eastern US and the Far West.

2. To superimpose on this graph off-season opportunities.

3. Each committee member to write an educational document on at least one agronomic practice that would encourage off-season fertilizer use.

E. T. York of the American Potash Institute wrote a paper, which appeared in the Potash Newsletter which showed that the growing practice in the Northeast is to use split applications of fertilizer to get improved forage crops on alfalfa, for example, an application after each cutting. The point was made that these principles may well apply elsewhere, and with some publicity the idea could spread.

P. W. Gull, Spencer Chemical, wrote on Bluegrass, published in February and March issues of Successful Farming, and makes the point that permanent bluegrass pastures represent a sleeping giant as a potential fertilizer user in the Northern US. Acreage is large. Bluegrass responds well to high rates of fertilizer. But much education is needed.

Quentin S. Lee, Cotton Producers Association, wrote on fishponds and the fishpond special 8-8-2 which was put on the CPA list for their spring sale. Fishpond fertilization is a continuing service, running through from March to October in the Southeast.

U. S. Jones, Olin Mathieson, discussed the soybean, which can use a generous supply of plant food in mid-season, about the time of flowering. At this time fertilizer may show significant yield increases, as demonstrated by numerous experiments on a wide range of soils. 6-24-24 was recommended as a side dressing.

M. H. McVickar, California Spray-Chemical wrote on rangeland, small grains and other West Coast crops that yield well to off-season fertilization. Of these, rangeland offers the greatest potential, and best application time is in the period just prior to the fall rains.

Charts herewith are those referred to in the report.

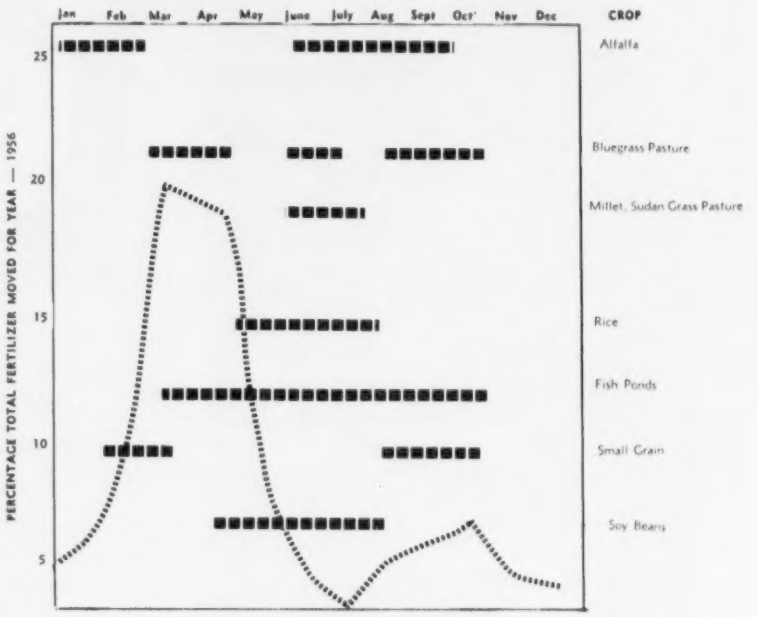


FIG. 1

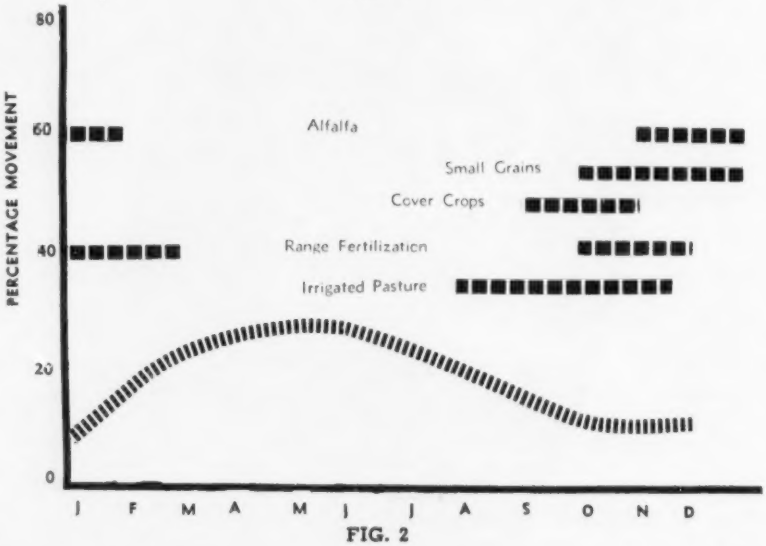


FIG. 2

St. Regis Machine Tests Filled Bags

An automatic flat drop testing machine, that can test filled multiwall bags faster and more accurately than the free-falling rate testers now in general use, has been developed by St. Regis Paper Company. Development of the machine resulted from a drop test program that is carried on by the company's multiwall Research Department, and it was designed as a further means of providing St. Regis' multiwall bag customers with the most complete and up-to-date quality control service possible.

1. Take-off time at IMC three-day training session on the "Full Orbit Service" finds S. B. McCoy addressing intent audience amidst appropriate space age decorations.
2. Top Brass gets the word. Left to right: Pat McGinnis, board chairman of Klau-Van Pietersom-Dunlap, Inc., Advertising Agency; H. F. Roderick, vice-president IMC Phosphate Chemical division; T. M. Ware, newly elected IMC president; N. C. White, vice-president IMC Potash division; F. B. Bowen, Production Manager, Phosphate Mineral division; J. D. Zigler, General Manager, Plant Food division.
3. Entire theme of meeting, as exemplified by decoration in general meeting room, was built around a space theme. Intensive training sessions, with various spaceship crews, took up the three-day meeting.
4. IMC executives discuss program as three-day training meeting opens. Left to right are: Pat McGinnis; A. E. Cascino, IMC Marketing Vice-President; T. M. Ware; S. B. McCoy, Sales Manager Potash Division; W. V. Chadwick, District Sales Manager Potash Division; N. C. White; C. E. Martin, District Sales Manager of the Agriculture Department of the Potash Division.

IMC TRAINS STAFF ON "FULL ORBIT" SERVICES

International Minerals & Chemical Corporation has announced the organization of a complete set of new customer services designed to help fertilizer manufacturers sell more of their product.

The new services, introduced to salesmen of the three IMC divisions which sell directly to fertilizer manufacturers, are the foundation of a well-rounded program which the company calls "Full Orbit Service."

Some 30 salesmen from the company's Phosphate Minerals, Phosphate Chemicals, and Potash Divisions got the first phase of a full training program on the services at a three-day sales meeting conducted in a "space age" setting at Chicago's Sheraton Hotel in late May (26-27-28).

The "full orbit" services are based on needs which fertilizer manufacturers, in an independent survey, said existed in their own companies.

"The program is unique in the fertilizer industry," according to A. E. Cascino, IMC vice-president in charge of marketing.

"It puts the emphasis on helping the manufacturer sell more of his product, but at the same time provides him with cost-cutting help in production, accounting, and other areas," he said.

The program to be offered IMC customers will include, for example, detailed information and instructions on how fertilizer manufacturers can analyze markets to realize full sales potential; how they can pick, train ,and direct salesmen; how they can organize, conduct, and put life and enthusiasm into dealer meetings, and how they can improve their advertising effectiveness.

Services in these fields by the specially-trained IMC salesmen, in addition to transportation and technical services, will be augmented by a series of how-to books based on recent studies of problems in the fertilizer industry.

Purchasing Agents Help Train Salesmen At Union Bag-Camp

Two representatives of the fertilizer industry were guest speakers at Union Bag-Camp Paper Corporation's recent training session for the company's multiwall bag salesmen. They were J. B. Lynch, general purchasing agent for Smith-Douglass Company, Inc., Norfolk, Virginia, and R. A. Garn, manager, chemical processing division, Farm Bureau Cooperative Association, Inc., Columbus, Ohio.

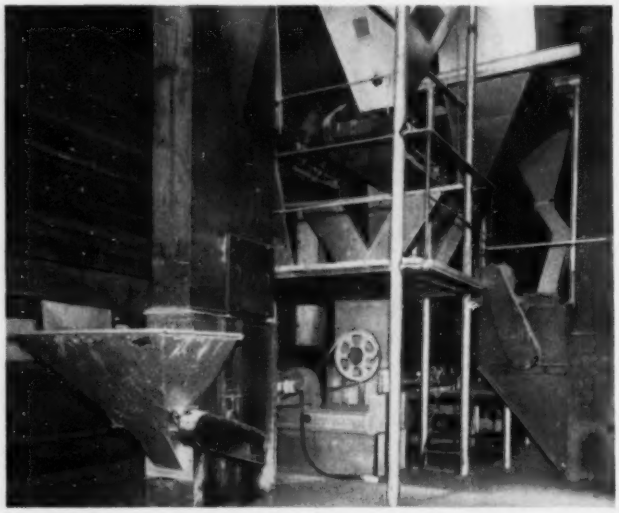
The talk by Mr. Lynch was on "Working with the Professional Buyer." Mr. Garn spoke on "The Fertilizer Manufacturer Looks at Packaging."

This participation reflects Union-Camp's realistic approach to sales training. The company regularly invites customers to address its sales groups and exchange ideas for the improvement of buyer-seller relationships.

ANOTHER C. E. 'FIRST'

A COMPLETE — ONE STEP CONTINUOUS PROCESS
ACIDULATION — MIXING — PELLETIZING

NOW A PROVEN REALITY — IT RUNS' ITSELF



In a
CONTINUOUS FLOW.
Easy - Clean Operation
Automatically Controlled

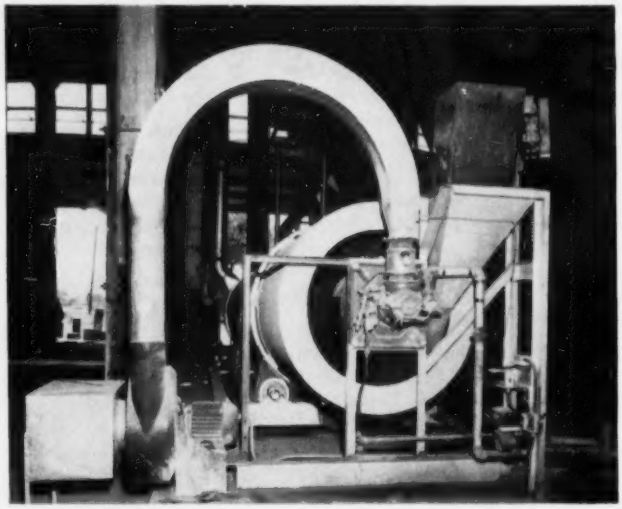
Uniform Pellet Size
98.6% —6, +16 mesh
1.4% —16, +24 on phosphate.

DESIGNED and CONSTRUCTED
for
Long Life - Trouble-Free Service

MANUFACTURE TRIPLE, ENRICHED or NORMAL PELLETIZED SUPERPHOSPHATE or COMPLETE HIGH-ANALYSIS PELLETIZED, HOMOGENOUS MIXED GOODS — RAW MATERIAL IN ONE END — FINISHED, CURED PRODUCT OUT THE OTHER. RAW ROCK TO FINISH GRANULATED PRODUCT IN ONE AND ONE-HALF HOURS

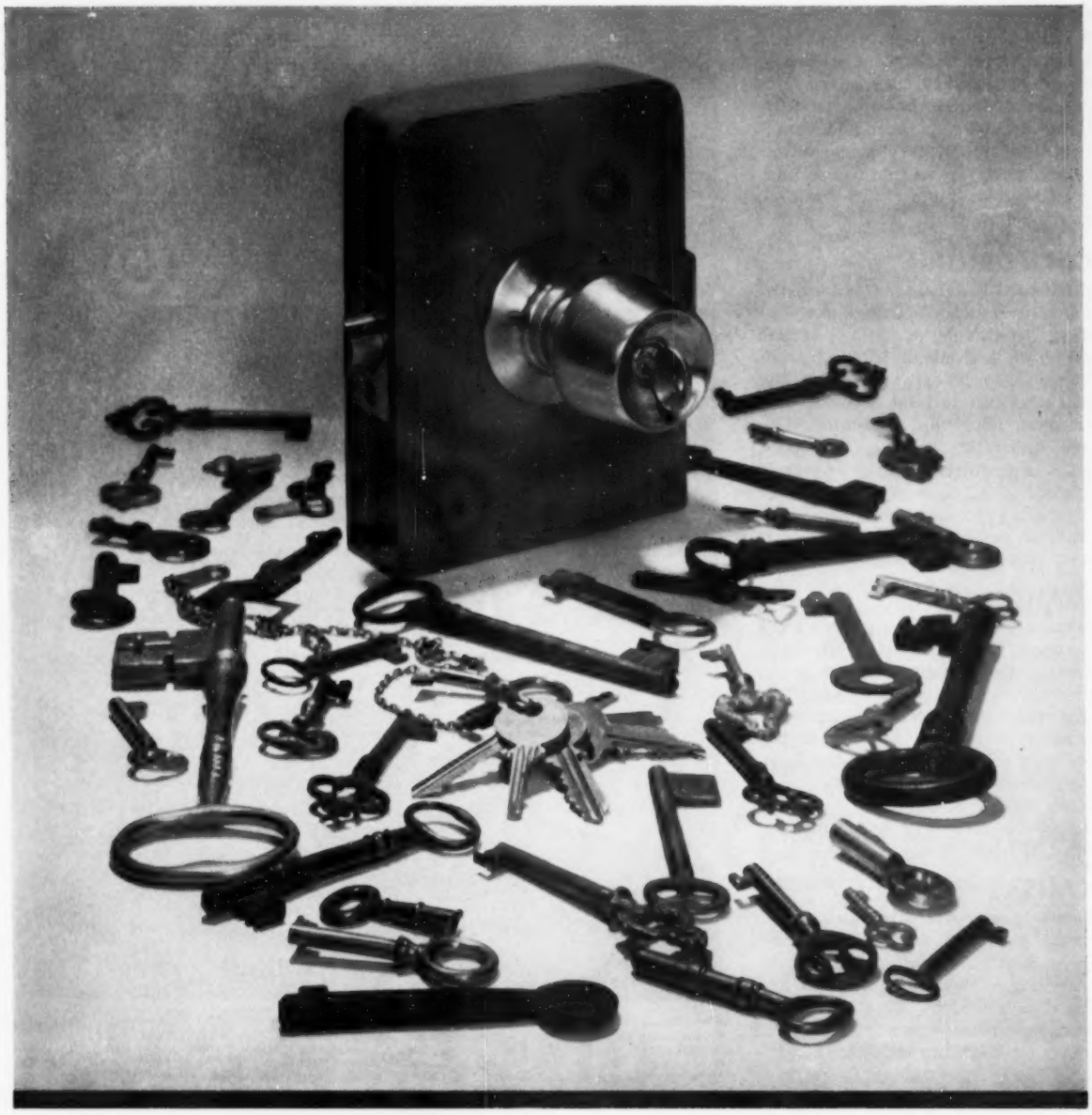
- **LOW POWER CONSUMPTION**
- **LOW FUEL CONSUMPTION**
- **LOW LABOR COST**
- **LOW SPACE REQUIREMENTS**
- **LOW INVESTMENT COST**
- **HIGH CAPACITY, 10-20 t.p.h.**

PERFORMANCE SO GOOD YOU MUST SEE IT TO BELIEVE IT.



For further information

WRITE, WIRE OR PHONE
R. W. PHILLIPS
CHEMICAL ENGINEERING SERVICE DIV. OF
(ORIGINALLY GREEN BAY, WIS.)
MANITOWOC SHIPBUILDING, INC.
MANITOWOC, WISCONSIN, U. S. A.



ONE FITS EXACTLY

It pays to buy nitrogen with care. Select a supplier who fits your requirements exactly – as one key fits a lock.

Before you buy, check these points: Does the supplier offer top quality nitrogen products? Are they readily available even during peak seasons? Moreover, can you get prompt, reliable, low-cost delivery?

Sinclair is in a position to fill all of your requirements – exactly. We can speed top quality nitrogen products to you from Hammond, Indiana – the center of the Midwest's transportation system.

Vast storage facilities for anhydrous ammonia and nitrogen solutions assure delivery where and *when* you need it. So make Sinclair your key source!

Anhydrous Ammonia • Ammonium Nitrate Solutions • Aqua Ammonia • Nitrogen Fertilizer Solutions • Aliphatic Solvents • Odorless Solvents • Aromatic Solvents • Heavy Aromatic Solvent • Toluene (Nitration Grade) • Xylene (Five Degree) • Para Xylene • Propylene Tetramer • Sulfur • Sulfonates (Oil Soluble) • Corrosion Inhibitors • Lube Oil Additives

SINCLAIR CHEMICALS, INC.

Affiliate of Sinclair Refining Company

600 Fifth Avenue, New York 20, N. Y.
155 North Wacker Drive, Chicago 6, Ill.

ARIZONA

Apache Powder Co. have opened at Benson an ammonia plant producing 30 daily tons whcih may be the forerunner of small-unit plants scattered strategically around the country. Built by **Girdler** it uses conventional methods and is fully integrated. It is the first of its kind, and the smallest in the US.

CALIFORNIA

Stauffer Chemical has completed plans to build a process development laboratory at their research center in Richmond. The construction will be under way by the time you read this and the $100,000 unit is to be ready by September. The new laboratory will include pilot plant and other facilities to permit evaluation of both organic and inorganic processes. Stauffer will transfer to the new site the work now going on at Torrance.

IDAHO

Monsanto is building a private road between its elemental phosphorus plant at Soda Springs and its phosphate mine 11.2 miles away. Over this will travel special carrier units capable of hauling 75 tons of ore on each trip, three times the haul load possible with present facilities. **Mack Truck** is building these vehicles—75 feet long and weighing some 100 tons, gross.

KANSAS

Cooperative Farm Chemicals will spend $5,000,000 on expansion of their nitrogen plant at Lawrence, according to **Howard A. Cowden,** association president. This expansion is designed to increase production there by 34,000 annual tons, and boost anhydrous ammonia storage capacity by 12,000 tons.

LOUISIANA

Freeport Sulphur began construction last month of what is said to be the first off-shore sulphur mining plant in the world. It is in the Gulf of Mexico, seven miles off the Louisiana coast. A steel island, it will be nearly a mile long, will rise 55 feet above the water, and is the main portion of Freeport's $30,000,000 Grand Isle project. Is is expected in production by 1960. Our readers will remember that this deposit was discovered by **Humble Oil.**

MARYLAND

American Agricultural Chemical has awarded the contract for construction of a new continuous ammoniation unit at its Baltimore plant.

Shown in the final stages of construction is the new worldwide headquarters of Dorr-Oliver Incorporated in Stamford, Connecticut. D-O offices in three separate Stamford locations were consolidated in the 120,000 square foot building over the weekend of June 6 and 7. Located on an 18 acre tract, the building provides office space for executive, administrative and financial staff, sales department and a majority of the company's technical divisions. It is essentially a hollow square surrounding a central landscaped court.

Florida East Coast Fertilizer Company, Homestead, South Florida's oldest fertilizer manufacturing plant, is celebrating 1958 as its 35th business anniversary year. It was incorporated on May 22, 1923. In fact H. C. Bardsley, sales manager, ventures that his firm "may even be the oldest manufacturing company in Dade (Metropolitan Miami) County. Modern in mechanization and technique, the plant has a capacity for mixing and bagging 30 tons of mixed fertilizer per hour. Its varied inventory of fertilizer components permits plant production of more than 500 different fertilizer formulas on short notice.

MISSISSIPPI

Farm Chemical and Fertilizer Corp., Bay St. Louis, has been chartered at $25,000.

* * *

Mississippi Federated Co-op's new plant at New Albany last month began production of variety of fertilizer grades. The plant employs 80 at peak periods.

NEVADA

United States Lime Products Corp. has opened a new $2,000,000 plant at Arrolime, 19 miles from Las Vegas. The concern is a subsidiary of **The Flintkote Company.** The plant has a capacity of 400 daily tons of lime products.

NEW JERSEY

Hercules Powder has made an increase of 50 daily tons of concentrated nitric acid, boosting to 200 daily tons the output of their Parlin plant, as the result of completing a new unit there.

Significant process changes enable the new unit to produce a 99 per cent concentrate of nitric acid in normal production compared to the 97 per cent concentrate resulting from conventional manufacturing methods.

Utilizing magnesium nitrate as a desiccant instead of sulfuric acid, tray or plate towers instead of the historic packed towers, the improved process results in lower capital costs

and significant savings in operation and maintenance. The process utilizes a vacuum flash evaporator as the water-removal step, and the product acid is completely free of sulfates as a result of the departure from the use of sulfuric acid as a desiccant.

The new unit was built by the **Badger Manufacturing Co.** Hercules is prepared to license the process both here and abroad.

TEXAS

Texas Gulf Sulphur has begun production at its new Fannett Dome operation in Jefferson County. It is designed to turn out 500,000 annual tons via the Frasch process. The facility was completed in 14 months by **Brown & Root,** Houston.

VIRGINIA

F. S. Royster suffered a kiln explosion in their plant at South Norfolk. Four were injured, two of whom were hospitalized.

WYOMING

Leonard Construction Co., subsidiary of **Monsanto** has been awarded contract to build the $750,000 sulphuric acid unit for **Fremont Minerals'** Riverton uranium ore processing plant. It will produce 125 daily tons.

BRAZIL

Nitrogenio S. A. Industrial Brasileira de Produtos Quimicos e Fertilizantes, Sao Paulo, is hunting $15,000,000 for a plant to produce 120 daily tons of ammonia, 150 of nitric acid, 180 of nitrochalk and 180 of urea. A prospectus is in the hands of Investment Division, Bureau of Foreign Commerce, US Dept. of Commerce, Washington 25, D. C.

CANADA

Texas Gulf Sulphur and **Devon-Palmer Oils** have begun work on an $8,000,000 jointly-owned sulphur extraction project near Calgary, Alberta.

CHINA

Nanking has begun operations in a potassium-nitrogen plant producing 10,000 annual tons.

ENGLAND

Fisons are completely rebuilding and mechanizing their Bramford Works, one of the oldest of their group. A special point is made of the dust-free atmosphere of the rejuvenated operation.

INDIA

Fertilisers and Chemicals, Alwaye, of which the Government holds 63%, and which has a capacity of 44,000 annual tons of ammonium sulphate, may be managed entirely by the Government. The matter is now under consideration in the Kerala Assembly.

* * *

Legislative Assembly has been informed that the fertiliser factory at Neiveli may well be started before 1960. Sanction has already been given and a foreign credit is contemplated. The plans call for a plant to produce about 70,000 annual tons of urea.

ITALY

Societa Chimica Ravenna, jointly owned by the Italian Government and **Wacker** of Germany is a producer of fertilizer, but also a big factor in "Europrene" rubber. They are scheduled to produce 650,000 annual tons of nitrogen fertilizer by next year, with the middle and far East as primary markets.

YUGOSLAVIA

Tovarna Dusika, Maribor, has invited the three Italian concerns, **Montecatini, Saffa** and **Bascini** to negotiate for equipment and technical assistance in the production of phosphorus and phosphoric acid.

WHY RESEARCH THE *Same* PROBLEM TWICE?

Texaco research may already have the solution to your fertilizer formulation problem.

Whether you're developing a new formulation or improving an old one, the chances are that the chemists at Texaco have already done some—and perhaps all—of the development work for you.

You economize two ways by calling Texaco for technical assistance: you avoid doing your own research on a problem that Texaco may already have solved; and Texaco's extensive research facilities can help you to develop a low-cost formula that's exactly right for your requirements.

In addition, Texaco's new facility at Lockport, Ill., will supply you with ammonia and nitrogen solutions that are pure and uniform, and deliver them in perfect condition at your own convenience. Call or write:

The Texas Company, *Petrochemical Sales Division,* 332 South Michigan Avenue, Chicago 4, Illinois, or 135 East 42nd Street, New York 17, N. Y.

TEXACO

PETROCHEMICALS

MARKETS

ORGANICS: The market on natural organic ammoniates for fertilizer use is quite tight, not only for immediate shipment, but also for the major part of the coming season. Practically all producers of leather nitrogenous tankage are completely committed for their new season's production, with prices nominally $3.00 to $4.00 per unit of ammonia, bulk, f.o.b. production point, for June through August shipment, and 25¢ per unit higher for September/December, with another 25¢ increase January/forward.

SEWAGE SLUDGE: One major producer in the Midwest has announced prices for the new season, at $2.60 per unit of ammonia, and 50¢ per unit of APA, July through September. For October through December, shipment price is 50¢ per unit of ammonia higher. For January through May, the price is increased another 15¢. For June 1959, it drops 15¢ per unit of ammonia.

CASTOR POMACE: Price of domestic castor pomace continues at recently announced price of $36.00 per ton, in bags, f.o.b. Eastern seaboard shipping point. Occasional offerings of imported material are around $5.00 per unit of ammonia, in bags, CIF Southeastern ports.

DRIED BLOOD: Chicago market is around $6.75 per unit of ammonia for sacked, unground blood, with the New York market around $5.50 to $6.00 per unit of ammonia.

POTASH: Domestic prices for the new season are still somewhat unsettled, with one producer recently revising its price downward for the first period of the new season.

GROUND COTTON BUR ASH: Price of this 38 to 40% K_2O potash material, primarily in the form of carbonate of potash, continues practically unchanged for the new season, with supplies, particularly for the fall, heavily booked. Price for most destinations compares favorably with domestic sulphate of potash.

SUPERPHOSPHATE: Production is tending downward, now that the season is about over, and prices continue firm, with supplies adequate for current needs.

AMMONIUM NITRATE LIMESTONE: Prices continue steady at previously announced levels, but volume of movement is tapering off as the season nears an end.

AMMONIUM NITRATE: Major producer has announced that effective August 1st the new price of ammonium nitrate will be $2.00 less than the current $72.00 basis per ton in bags.

SULPHATE OF AMMONIA: Prices for the new season are up $1.00 per ton for synthetic type, and the same as last season for coke oven type, in bulk. New prices are $35.00 and $32.00 per ton, bulk, respectively at origin points.

GENERAL: Throughout the Southeast and Midwest, fertilizer manufacturers are winding up their season's activities with profit margins disappointing, as a result of less volume of business and highly competitive conditions. Manufacturers are watching the markets closely on raw materials for the new season, and it appears that potash prices will be reduced from last season's levels. Organic ammoniates, according to present indications, will be in somewhat short supply, and prices tend upward. There is no apparent indication of any difficulty in the supply situation on superphosphate rock.

U.S. Fertilizer Imports Decreased During 1957

Recent information from the Department of Commerce indicates that imports of fertilizer materials again declined during 1957, attributed jointly to the relatively stable consumption pattern and to new domestic production capacity.

Ammonium sulfate imports showed the sharpest decline, off nearly 33% from the 1956 total of 197,650 tons; urea registered a loss of almost 26% to 59,241 tons in 1957; ammonium phosphate also declined to 169,471 tons, approximately 12% under the 1956 figure; prepared fertilizer mixtures showed an 18% drop, to 27,524 tons.

Some materials registered a gain for the year: compounded fertilizer imports rose 117% to 69,566 tons; guano was up 63% from its 1956 total of 12,496 tons; and potassium-sodium nitrate mixtures gained nearly 24% to tally 25,393 tons for 1957.

CF-Staff Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	May 1958	May 1957	April 1958	April 1957	Jan.-Mar. Qtr. 1958	Jan.-Mar. Qtr. 1957	July-December 1957	July-December 1956	January-June 1957	January-June 1956	YEAR (July-June) 1956-57	YEAR (July-June) 1955-56
Alabama	------	162,101[1]	263,953	292,964	246,637	291,116	172,721	174,623	808,900	872,550	983,607	1,042,416
Arkansas	31,301	52,965	89,621	64,536	75,919	120,907	62,752	59,915	265,265	299,172	325,150	359,471
Georgia	302,211	301,056	262,313	322,144	146,308	221,375	269,529	253,559	980,824	988,454	1,234,383	1,244,422
Kentucky	------	142,280[1]	99,166	105,114	139,541	173,850	88,771	90,284	451,083	441,481	541,367	529,600
Louisiana	39,321	42,699	59,782	48,929	105,459	81,709	64,192	71,129	200,277	217,343	271,406	273,688
Missouri	------	129,714[1]	133,859	60,716	79,445	219,689	335,312	331,343	460,487	444,230	791,830	800,471
N. Carolina	------	211,294[1]	414,140	488,082	438,009	534,774	199,446	216,234	1,300,353	1,324,267	1,516,587	1,649,449
Oklahoma	13,983	8,484	15,766	10,624	20,160	27,868	51,436	54,509	52,836	65,854	107,345	135,396
S. Carolina	102,787	72,526	172,505	199,381	286,778	393,741	116,874	122,929	694,571	743,670	817,500	863,617
Tennessee	112,462	137,378	65,668	86,741	84,114	48,649	135,717	141,181	383,457	378,626	549,253	532,886
Texas	90,118	60,589	100,423	72,506	163,525	205,547	213,801	202,406	392,770	372,695	595,176	566,399
California	(reports compiled quarterly)				253,545	264,270	------	412,747[1]	663,484	639,377	1,079,748	1,001,554
Virginia	(reports compiled quarterly)				218,551	277,124	140,784	154,075	600,158	599,111	754,223	761,820
Indiana	(reports compiled semi-annually)						284,959	305,917	781,268	807,981	1,087,185	1,063,049
Iowa	(reports compiled semi-annually)						------	85,147[1]	------	315,329[1]	------	445,329[1]
Michigan	(reports compiled semi-annually)						------	184,763[1]	------	443,908[1]	------	*
New Hampshire	(reports compiled semi-annually)						3,966	3,253	15,730	13,168	18,983[1]	*
Washington	(reports compiled semi-annually)						------	55,709[1]			------	76,660[1]
Oregon	(report issued annually)						45,063	62,147	138,926	120,871	201,073[1]	*
TOTAL	692,183	675,697	1,677,196	1,751,717	2,257,991	2,860,619	2,185,323	2,243,504	8,190,389	8,328,850	10,654,760	10,824,238

------(not yet reported) * Not compiled [1] Omitted from column total to allow comparison with some period of current year.

Bruce Cloaninger (center) of South Carolina was elected president of the Southern Control Officials at their June meeting. Harold Hoffman (left) of Florida became vice president, and Bruce Poundstone (right) of Kentucky was reelected secretary-treasurer.

Southern Control Officials Hold 3-Day Atlanta Meeting

Fertilizer control officials from 15 southern states met for a three-day program in Atlanta, Ga. June 9-11, with attendance running well beyond the hundred mark.

Retiring President E. W. Constable of North Carolina opened the meeting with an address on the changing picture in control activities.

Also appearing on the initial session was Dr. Samuel Tisdale, National Plant Food Institute's Southern regional director, who revealed to the control group results of NPFI's recent fertilizer marketing survey.

Dr. Ralph Wehunt, extension agronomist for soils and fertilizers at the University of Georgia, appeared on the program the second day to outline the state's soil fertility program and summarize the effect it has had in the counties where a "crash program" was initiated this year.

On the afternoon program that day Bruce Poundstone of Kentucky, secretary-treasurer of the association, reported on the progress of the officials' efforts toward a uniform state fertilizer tonnage report system. More agreement was obtained from the various states and manufacturers on the need for a uniform reporting method than on the construction of a report form, he revealed, and—while progress toward this goal is definitely being made—nationwide application of the desired uniformity is still in the indefinite future.

At the business session that evening, the Southern Control Officials elected Bruce Cloaninger of South Carolina to head their association during the coming year. Harold Hoffman of Florida was named vice president, and Bruce Poundstone of Kentucky was reelected to the secretary-treasurer post.

The group decided to hold their 1959 meeting in Arkansas, where Henry DeSalvo will be in charge of local arrangements.

The final day of the convention was devoted to a closed session at which the control officials studied control problems relating to feeds, fertilizers and pesticides.

Industry Calendar

Date	Organization	Place	City
July 8-10	Pac. N.W. Fert. Conf.	Bannock Hotel	Pocatello, Idaho
July 13-15	Plant Food Inst. of N.C. and Va.	Cavalier Hotel	Va. Beach, Va.
July 18-19	S.W. Fert. Conf.	Buccaneer Hotel	Galveston, Tex.
Aug. 20-24	Canadian Fert. Assn.	Manoir Richelieu	Murray Bay
Oct. 16-17	Fert. Control Officials	Shoreham Hotel	Washington, D.C.
Oct. 22-24	Pacific N.W. Fert. Assn.	----------	Gearhart, Ore.
Oct. 29-31	Fert. Round Table	Sheraton Park Hotel	Wash., D. C.
Nov. 9-11	Calif. Fert. Assn.	Ambassador Hotel	Los Angeles, Cal.
Dec. 3-5	Ag. Ammonia Inst.	Morrison Hotel	Chicago, Ill.

Classified Advertising

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

HELP WANTED

SUPERINTENDENT OLD-LINE FERTILIZER CONCERN: Located Southeast. Must be under 50 years of age and thoroughly familiar with all phases of medium-sized plant operation including ammoniation, mixing and shipping as well as plant and machinery maintenance and repair. Desire to supervise granulation unit will be helpful in future planning. All replies will be held in strictest confidence. State all pertinent information in replying such as age, fertilizer experience, marital status, state of health, and availability date. Salary range necessary should be stated. Box # 37, % Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Georgia.

EQUIPMENT WANTED

WANTED: One-ton used mixer and bagging machine with complete equipment—in good condition. Reply giving full details, with price, to Box 38, % Commercial Fertilizer, 75 Third St., N.W., Atlanta 8, Ga.

Cooperatives *(Continued from page 8)*

bers, to a total—as we have already said—of $261,255,000 for the 1955-56 season.

As of 1956 the US total shows 9,876 cooperatives doing a total business of $9,769,067,000. Of these 139 are in New England; 666 in Middle Atlantic; 1,985 in East North Central; 3,869 in West North Central; 605 in the South Atlantic; 400 in East South Central; 914 in West South Central; 528 in the Mountain states; 770 in the Pacific area.

These numbers are significant largely to show distribution of the cooperative idea. With mergers offsetting new organizations, the total number of cooperatives is less important than the number of farmer members, the nearly eight million we have already mentioned.

EQUIPMENT FOR SALE

FOR SALE: Nearly new 3-scale stainless steel open-mouth Bemis bagger and "V" bag conveyor. C. Roy Curtis & Son, Inc., Marion, N.Y.

FOR SALE: 2-7'6" x 55' and 80" x 65' Rotary Dryers, 3 - Louisville 6" x 50' Rotary Steam Tube Dryers, also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. BRILL EQUIPMENT COMPANY, 2401 Third Ave., New York 51, N. Y.

LIQUIDATION SALE: Spiral Ribbon Mixers, 336, 200, 75, 15 cu. ft. Dewatering Presses, Davenport No. 1A, No. 2A, No. 3A, Louisville 8-roll 36". (8) Louisville Rotary Steam Tube Dryers, 6' x 50', 6' x 30', 6' x 25'. Storage Tanks from 1,000 gallon to 20,000 gallon, steel, stainless steel, aluminum. PERRY EQUIPMENT CORP.,

ADVERTISING INDEX

MARKETS

ORGANICS: The market on natural organic ammoniates for fertilizer use is quite tight, not only for immediate shipment, but also for the major part of the coming season. Practically all producers of leather nitrogenous tankage are completely committed for their new season's production, with prices nominally $3.00 to $4.00 per unit of ammonia, bulk, f.o.b. production point, for June through August shipment, and 25¢ per unit higher for September/December, with another 25¢ increase January/forward.

SEWAGE SLUDGE: One major producer in the Midwest has announced prices for the new season, at $2.60 per unit of ammonia, and 50¢ per unit of APA, July through September. For October through December, shipment price is 50¢ per unit of ammonia higher. For January through May, the price is increased another 15¢. For June 1959, it drops 15¢ per unit of ammonia.

CASTOR POMACE: Price of domestic castor pomace continues at recently announced price of $36.00 per ton, in bags, f.o.b. Eastern seaboard shipping point. Occasional offerings of imported material are around $5.00 per unit of ammonia, in bags, CIF Southeastern ports.

DRIED BLOOD: Chicago market is around $6.75 per unit of ammonia for sacked, unground blood, with the New York market around $5.50 to $6.00 per unit of ammonia.

POTASH: Domestic prices for the new season are still somewhat unsettled, with one producer recently revising its price downward for the first period of the new season.

GROUND COTTON BUR ASH: Price of this 38 to 40% K_2O potash material, primarily in the form of carbonate of potash, continues practically unchanged for the new season, with supplies, particularly for the fall, heavily booked. Price for most destinations compares favorably with domestic sulphate of potash.

SUPERPHOSPHATE: Production is tending downward, now that the season is about over, and prices continue firm, with supplies adequate for current needs.

AMMONIUM NITRATE LIMESTONE: Prices continue steady at previously announced levels, but volume of movement is tapering off as the season nears an end.

AMMONIUM NITRATE: Major producer has announced that effective August 1st the new price of ammonium nitrate will be $2.00 less than the current $72.00 basis per ton in bags.

SULPHATE OF AMMONIA: Prices for the new season are up $1.00 per ton for synthetic type, and the same as last season for coke oven type, in bulk. New prices are $35.00 and $32.00 per ton, bulk, respectively at c[illegible]gin points.

GENERAL: Throughout the Southeast and Midwest, fertilizer manufacturers are winding up their season's activities with profit margins disappointing, as a result of less volume of business and highly competitive conditions. Manufacturers are watching the markets closely on raw materials for the new season, and it appears that potash prices will be reduced from last season's levels. Organic ammoniates, according to present indications, will be in somewhat short supply, and prices tend upward. There is no apparent indication of any difficulty in the supply situation on superphosphate rock.

U.S. Fertilizer Imports Decreased During 1957

Recent information from the Department of Commerce indicates that imports of fertilizer materials again declined during 1957, attributed jointly to the relatively stable consumption pattern and to new domestic production capacity.

Ammonium sulfate imports showed the sharpest decline, off nearly 33% from the 1956 total of 197,650 tons; urea registered a loss of almost 26% to 59,241 tons in 1957; ammonium phosphate also declined to 169,471 tons, approximately 12% under the 1956 figure; prepared fertilizer mixtures showed an 18% drop, to 27,524 tons.

Some materials registered a gain for the year: compounded fertilizer imports rose 117% to 69,566 tons; guano was up 63% from its 1956 total of 12,496 tons; and potassium-sodium nitrate mixtures gained nearly 24% to tally 25,393 tons for 1957.

CF-Staff Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	May		April		Jan.-Mar. Qtr.		July-December		January-June		YEAR (July-June)	
	1958	1957	1958	1957	1958	1957	1957	1956	1957	1956	1956-57	1955-56
Alabama	------	162,101[1]	263,953	292,964	246,637	291,116	172,721	174,623	808,900	872,550	983,607	1,042,416
Arkansas	31,301	52,965	89,621	64,536	75,919	120,907	62,752	59,915	265,265	299,172	325,150	359,471
Georgia	302,211	301,056	262,313	322,144	145,308	221,375	269,529	253,559	980,824	988,454	1,234,383	1,244,422
Kentucky	------	142,280[1]	99,166	105,114	139,541	173,850	88,771	90,284	451,083	441,481	541,367	529,600
Louisiana	39,321	42,699	59,782	48,929	105,459	81,709	64,192	71,129	200,277	217,343	271,406	273,688
Missouri	------	129,714[1]	133,859	60,716	79,445	219,689	335,312	331,343	460,487	444,230	791,830	800,471
N. Carolina	------	211,294[1]	414,140	488,082	438,009	534,774	199,446	216,234	1,300,353	1,324,267	1,516,587	1,649,449
Oklahoma	13,983	8,484	15,766	10,624	20,160	27,868	51,436	54,509	52,836	65,854	107,345	135,396
S. Carolina	102,787	72,526	172,505	199,381	286,778	393,741	116,874	122,929	694,571	743,670	817,500	863,617
Tennessee	112,462	137,378	65,668	86,741	84,114	48,649	135,717	141,181	383,457	378,626	549,253	532,886
Texas	90,118	60,589	100,423	72,506	163,525	205,547	213,801	202,406	392,770	372,695	595,176	566,399
California	(reports compiled quarterly)				253,545	264,270	------	412,747[1]	663,484	639,377	1,079,748	1,001,554
Virginia	(reports compiled quarterly)				218,551	277,124	140,784	154,075	600,158	599,111	754,223	761,820
Indiana	(reports compiled semi-annually)						284,959	305,917	781,268	807,981	1,087,185	1,063,049
Iowa	(reports compiled semi-annually)						------	85,147[1]	------	315,329[1]	------	445,329[1]
Michigan	(reports compiled semi-annually)						------	184,763[1]	------	443,908[1]	------	*
New Hampshire	(reports compiled semi-annually)						3,966	3,253	15,730	13,168	18,983[1]	*
Washington	(reports compiled semi-annually)						------	55,709[1]			------	76,660[1]
Oregon	(report issued annually)						45,063	62,147	138,926	120,871	201,073[1]	*
TOTAL	692,183	675,697	1,677,196	1,751,717	2,257,991	2,860,619	2,185,323	2,243,504	8,190,389	8,328,850	10,654,760	10,824,238

------(not yet reported) * Not compiled [1] Omitted from column total to allow comparison with some period of current year.

Bruce Cloaninger (center) of South Carolina was elected president of the Southern Control Officials at their June meeting. Harold Hoffman (left) of Florida became vice president, and Bruce Poundstone (right) of Kentucky was reelected secretary-treasurer.

Southern Control Officials Hold 3-Day Atlanta Meeting

Fertilizer control officials from 15 southern states met for a three-day program in Atlanta, Ga. June 9-11, with attendance running well beyond the hundred mark.

Retiring President E. W. Constable of North Carolina opened the meeting with an address on the changing picture in control activities.

Also appearing on the initial session was Dr. Samuel Tisdale, National Plant Food Institute's Southern regional director, who revealed to the control group results of NPFI's recent fertilizer marketing survey.

Dr. Ralph Wehunt, extension agronomist for soils and fertilizers at the University of Georgia, appeared on the program the second day to outline the state's soil fertility program and summarize the effect it has had in the counties where a "crash program" was initiated this year.

On the afternoon program that day Bruce Poundstone of Kentucky, secretary-treasurer of the association, reported on the progress of the officials' efforts toward a uniform state fertilizer tonnage report system. More agreement was obtained from the various states and manufacturers on the need for a uniform reporting method than on the construction of a report form, he revealed, and—while progress toward this goal is definitely being made—nationwide application of the desired uniformity is still in the indefinite future.

At the business session that evening, the Southern Control Officials elected Bruce Cloaninger of South Carolina to head their association during the coming year. Harold Hoffman of Florida was named vice president, and Bruce Poundstone of Kentucky was reelected to the secretary-treasurer post.

The group decided to hold their 1959 meeting in Arkansas, where Henry DeSalvo will be in charge of local arrangements.

The final day of the convention was devoted to a closed session at which the control officials studied control problems relating to feeds, fertilizers and pesticides.

Industry Calendar

Date	Organization	Place	City
July 8-10	Pac. N.W. Fert. Conf.	Bannock Hotel	Pocatello, Idaho
July 13-15	Plant Food Inst. of N.C. and Va.	Cavalier Hotel	Va. Beach, Va.
July 18-19	S.W. Fert. Conf.	Buccaneer Hotel	Galveston, Tex.
Aug. 20-24	Canadian Fert. Assn.	Manoir Richelieu	Murray Bay
Oct. 16-17	Fert. Control Officials	Shoreham Hotel	Washington, D.C.
Oct. 22-24	Pacific N.W. Fert. Assn.	----------	Gearhart, Ore.
Oct. 29-31	Fert. Round Table	Sheraton Park Hotel	Wash., D. C.
Nov. 9-11	Calif. Fert. Assn.	Ambassador Hotel	Los Angeles, Cal.
Dec. 3-5	Ag. Ammonia Inst.	Morrison Hotel	Chicago, Ill.

Classified Advertising

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

HELP WANTED

SUPERINTENDENT OLD-LINE FERTILIZER CONCERN: Located Southeast. Must be under 50 years of age and thoroughly familiar with all phases of medium-sized plant operation including ammoniation, mixing and shipping as well as plant and machinery maintenance and repair. Desire to supervise granulation unit will be helpful in future planning. All replies will be held in strictest confidence. State all pertinent information in replying such as age, fertilizer experience, marital status, state of health, and availability date. Salary range necessary should be stated. Box # 37, % Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Georgia.

EQUIPMENT WANTED

WANTED: One-ton used mixer and bagging machine with complete equipment—in good condition. Reply giving full details, with price, to Box 38, % Commercial Fertilizer, 75 Third St., N.W., Atlanta 8, Ga.

Cooperatives *(Continued from page 8)*

bers, to a total—as we have already said—of $261,255,000 for the 1955-56 season.

As of 1956 the US total shows 9,876 cooperatives doing a total business of $9,769,067,000. Of these 139 are in New England; 666 in Middle Atlantic; 1,985 in East North Central; 3,869 in West North Central; 605 in the South Atlantic; 400 in East South Central; 914 in West South Central; 528 in the Mountain states; 770 in the Pacific area.

These numbers are significant largely to show distribution of the cooperative idea. With mergers offsetting new organizations, the total number of cooperatives is less important than the number of farmer members, the nearly eight million we have already mentioned.

EQUIPMENT FOR SALE

FOR SALE: Nearly new 3-scale stainless steel open-mouth Bemis bagger and "V" bag conveyor. C. Roy Curtis & Son, Inc., Marion, N.Y.

FOR SALE: 2-7'6" x 55' and 80" x 65' Rotary Dryers, 3 - Louisville 6" x 50' Rotary Steam Tube Dryers, also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. BRILL EQUIPMENT COMPANY, 2401 Third Ave., New York 51, N. Y.

LIQUIDATION SALE: Spiral Ribbon Mixers, 336, 200, 75, 15 cu. ft. Dewatering Presses, Davenport No. 1A, No. 2A, No. 3A, Louisville 8-roll 36". (8) Louisville Rotary Steam Tube Dryers, 6' x 50', 6' x 30', 6' x 25'. Storage Tanks from 1,000 gallon to 20,000 gallon, steel, stainless steel, aluminum. PERRY EQUIPMENT CORP.,

ADVERTISING INDEX

Progress Report

POTASH COMPANY OF AMERICA, LTD.

Our expenditure of over $20,000,000 will assure you of two dependable sources of supply for the coming fertilizer year—two mines, two refineries, two separate storage locations, and two originating railroads. Our service will be outstanding and will surpass that offered by any other potash producer.

P.C.A.
The SALT of the EARTH
RED MURIATE

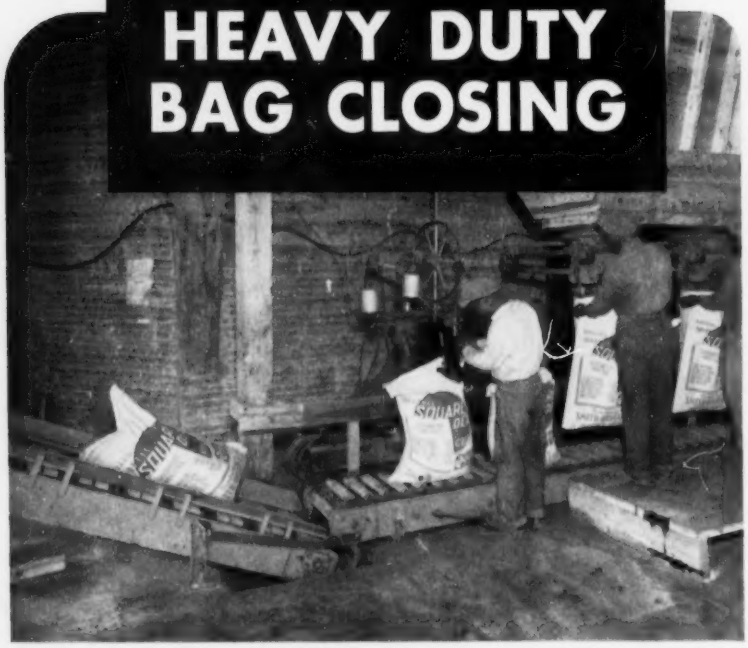
New 60% Standard Muriate
New 60% Special Granular Muriate
New 60% Coarse Granular Muriate
Sulphate of Potash
Chemical Muriate - 99.9% KCL minimum

Quick Service — High Quality
Phone, write, telex, or wire us.
Phone STerling 3-4990, Washington
TWX No. — WA - 331

POTASH COMPANY OF AMERICA
CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

HEAVY DUTY BAG CLOSING



UNION SPECIAL builds sewing heads and auxiliary equipment for closing all types and sizes of filled bags. These sewing heads set the standard the world over for speed, economy, and dependability — wherever the product is bagged. They stand up longer in all kinds of service and under the most severe working conditions. They are capable of high production day-in and day-out. For detailed information, ask for a copy of Bulletin No. 200. See our nearest representative or write today.

— calls for

Union Special® equipment!

STYLE 20500 B

This heavy duty unit is designed for closing 100 lb. textile or multiwall paper bags at rates up to 3,840 bags per 8 hr. day. Gear driven horizontal and inclined conveyor. Counterbalanced sewing head easily adjustable for height of bag. Sewing speed synchronized with conveyor speed. Choice of controls.

Union Special MACHINE COMPANY
412 North Franklin St.
Chicago 10, Ill.

● **SEND FOR BULLETIN No. 200**